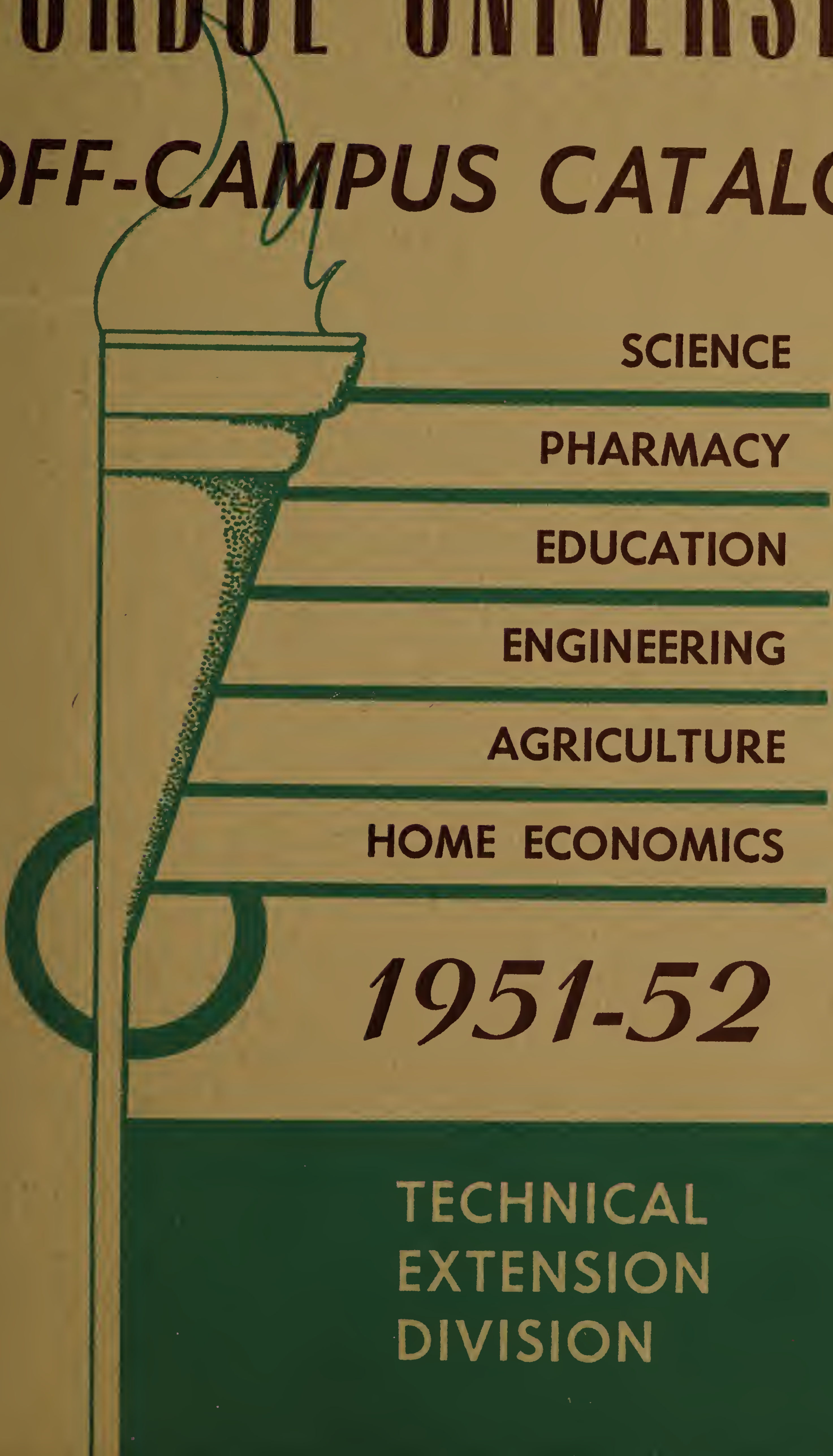
PURDUE UNIVERSITY

OFF-CAMPUS CATALOG



SCIENCE
PHARMACY
EDUCATION
ENGINEERING
AGRICULTURE
HOME ECONOMICS

1951-52

TECHNICAL
EXTENSION
DIVISION

CALENDAR

1951-1952

September 17	Orientation Examinations
September 20, 21, 22	Registration for First Semester
September 24, 7:00 A.M.	First Semester Classes Begin
November 22	Thanksgiving Holiday
December 22, 12 Noon	Christmas Recess Begins
January 7, 7 A.M.	Christmas Recess Ends
January 26, 12 Noon	First Semester Ends
January 28	Orientation Examinations
January 29, 30	Registration for Second Semester
January 31, 7 A.M.	Second Semester Classes Begin
April 9, 6 P.M.	Easter Recess Begins
April 17, 7 A.M.	Easter Recess Ends
May 28	Second Semester Ends
June 5	Orientation Examinations
June 6, 7	Registration for Summer Session
June 9	Summer Session Classes Begin
July 4	Independence Day
August 2, 12 Noon	Summer Session Ends

The extension activities of Purdue University operate within the Technical Extension Division. Information regarding the extension offerings of the University may be obtained by writing to the Dean, Technical Extension Division, 209 Service and Stores Building, Purdue University, Lafayette, Indiana.

Serving the Needs of the People of the State

PURDUE UNIVERSITY

offers an

OFF-CAMPUS PROGRAM

of

COLLEGE WORK

The Catalog

for the

School Year 1951-1952

TECHNICAL EXTENSION DIVISION

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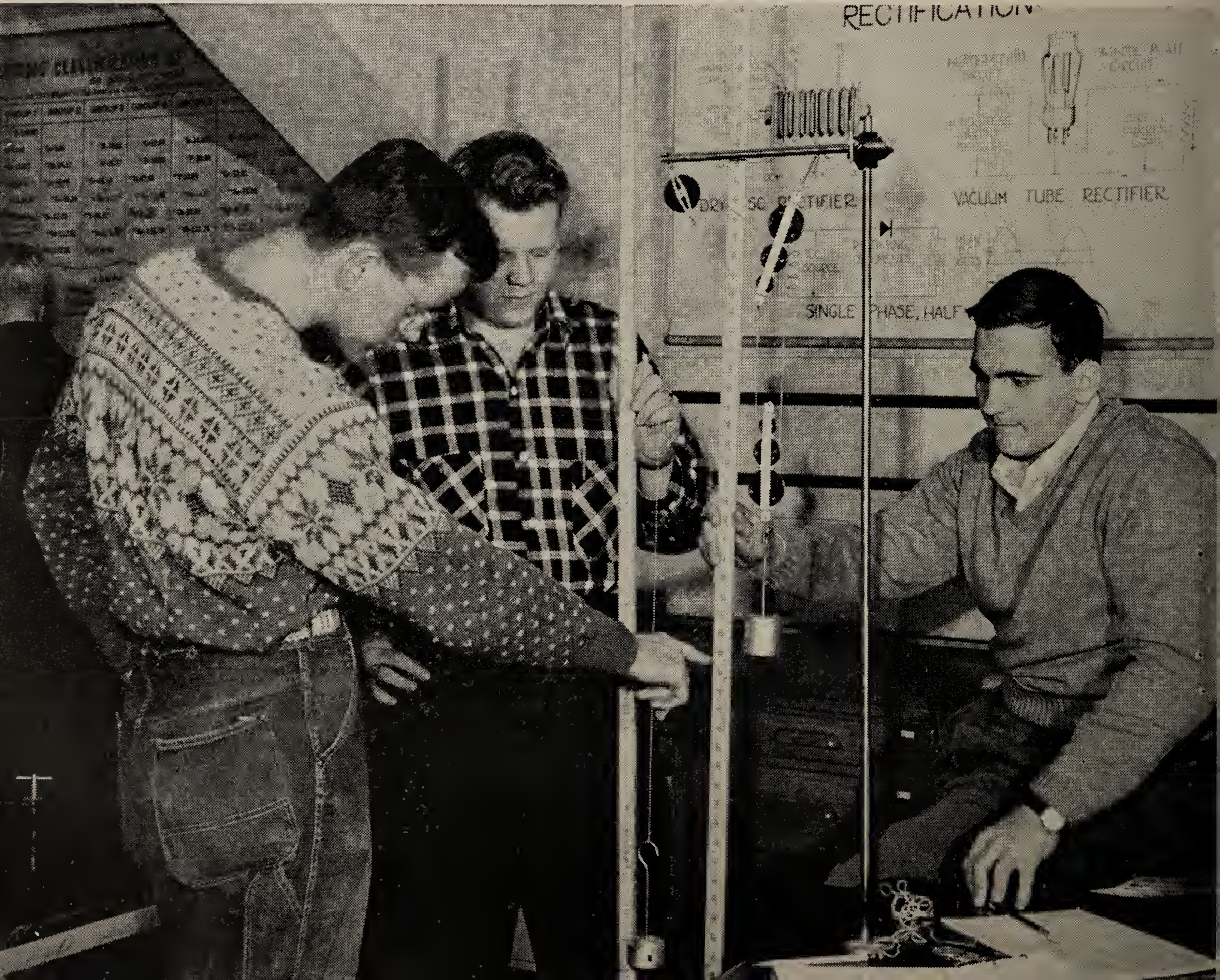
Well equipped classrooms and laboratories are combined with competent instructors to provide students with a high quality college opportunity.



PURDUE UNIVERSITY

Off-Campus Program

PURDUE UNIVERSITY, a land-grant institution, extends its programs of study in science, technology, and agriculture through University Centers, which have been established in order to better serve the needs of the people of the State. The Off-Campus University Centers provide an opportunity for students, in many cases, to live at home and take regular University work. In addition, this state-wide program provides many credit and non-credit courses, correspondence instruction, short courses, demonstrations, lectures, conferences, publications, and other formal and informal enterprises for the purpose of making available to the people of the State the educational resources of the University.

College Credit Courses. College credit courses carry residence credit (with certain limitations on graduate courses) and are identical in quality and content with courses given on the Lafayette campus. All instructors, full- or part-time, are selected and approved by the heads of the various academic schools and departments. Courses are planned and supervised by the schools and departments in the same manner as on campus. Enrollment in a Center is enrollment in Purdue.

Non-Credit Courses. The University will offer non-credit classes, of an adult nature, which are within the scope of its teaching facilities. Any interested group may request a course from those listed in the current catalog, or may request assistance in the development of a course to meet their particular needs. A member of the extension staff will assist with the planning and operation of such a class.

Freshman Work. Freshman work acceptable toward a degree in the Schools of Engineering, Science, Pharmacy, Agriculture, Home Economics, and the Trade and Industrial Education Department of the Division of Education and Applied Psychology is offered through the off-campus program. Courses such as shop and military training, which are not offered off-campus, may be postponed until the end of the freshman year. Students may enroll on the Lafayette campus after completion of their first year, or may continue their studies at the Center if the required courses are available. However, students are cautioned to consult their advisors or Center director concerning the amount of work they profitably can pursue off-campus.

The courses recommended in the freshman programs of studies, which follow **(and are so indicated by bold-faced type),** constitute a full college load and will require about 23 hours in class each week. After having completed a full freshman year's work, students may transfer to the campus as sophomores.

Special Services for Industry

The Technical Extension Division will cooperate with individual industries in the development and operation of their industrial training programs. However, such programs may be limited to the extent that facilities and staff are available. Such service is rendered without charges other than the regular fees assessed for student enrollment in classes.

At the present time cooperative programs of this kind are being offered to employees of Indiana industries. Typical examples of the programs which have been offered or are being offered are as follows:

Inland Steel Company. Specialized programs are operated to train mechanical, electrical, chemical and metallurgical technicians.

International Harvester Company. Technical and cultural courses supplementing the workers' job activities are operated in formal classes.

Joseph E. Seagram and Sons, Inc. General interest courses with college credit are offered in the plant for groups wishing further education development.

Requirements for Admission

For admission to the freshman class one must present credit in 15 units of secondary-school work.

Of the fifteen units, seven are prescribed for all applicants, namely:

English	**3 units**
History or Social Science	**1 unit**
Algebra	
Engineering	**1½ units**
Physical Education	
for Men	**0 units**
All others	**1 unit**
Plane Geometry	
Engineering	**1 unit**
Physical Education	
for Men	**0 units**
All others	**1 unit**
Science (with laboratory)	**1 unit**

Three additional units must be chosen from English, languages other than English, mathematics, science, history, and social science.

For admission to the engineering schools the following subjects must be included:

Intermediate Algebra	**½ unit**	**Solid Geometry**	**½ unit**

The remaining five units may be chosen from any other subjects in which credit for graduation has been allowed in the secondary school, or in which entrance examinations have been passed.

An application for admission must be made on the proper form obtainable from any of the University Centers or from the Director of Admissions. The University prefers to receive the application at least two months in advance of registration. Applicants from high schools should apply as soon as possible after the beginning of their last semester in high school.

Admission with Deficiencies. No student is admitted with deficiencies unless he ranks in the upper third of his graduating class. He is not admitted to the Schools of Engineering unless he has completed both algebra and plane geometry. If he is deficient in solid geometry, he may make this up by taking a non-credit correspondence course or a non-credit course on or off campus. A deficiency in advanced algebra may be removed by a non-credit correspondence course or by completion of Mathematics 1.

Orientation and Placement Examinations. New students are required to take the following orientation tests: psychological, English, physical science, and mathematics. A placement test in drawing may be given for those requesting an evaluation of previous experience. These tests are not entrance examinations.

Where facilities and enrollment in an University Center permit, students may be classified according to their abilities and training. The score on the English placement tests will determine whether a new student is assigned to English A, 1, 27, or 32. The score on the mathematics placement test will determine whether the new student in engineering or in science (major in mathematics, chemistry, or physics only) will be assigned to Mathematics 1 or 31. The score on the engineering drawing test will determine whether the student in engineering will take G.E. 11 or 12. Additional information about placement in English, mathematics, and engineering drawing may be found under the department listing of the courses.

Grading Systems

6, Excellent; 5, Good; 4, Fair; 3, Passing; 2, Condition; 1, Failure; 0, Incomplete; W, Withdrawn with satisfactory performance; W1, Withdrawn with unsatisfactory performance.

Only two grades will be given in a non-credit course: S, Satisfactory; U, Unsatisfactory.

Scholarship Index. For every student there will be computed, at the end of each semester, a scholarship index by using the following formula:

$$S = \frac{6N_6 + 5N_5 + 4N_4 + 3N_3 + 2N_2 + N_1}{N_6 + N_5 + N_4 + N_3 + N_2 + N_1}$$

where S equals scholarship index; N_6, total number of semester hours of grade 6; N_5, total number of semester hours of Grade 5, etc.

A cumulative index will be also computed by the same formula, where N_6 is the total number of hours of Grade 6, etc. If more than one grade is recorded for the same course, the course is counted the corresponding number of times in computing the index.

Distinguished Students. Of the undergraduate students enrolled in curricula leading to degrees, and carrying at least fourteen semester hours of assigned work, those whose scholarship index at the end of any regular semester is equal to or greater than 5.00 are designated as distinguished students of that semester.

Engineering Students. Students enrolled in the schools of engineering must have attained a cumulative scholastic index of 3.2 or higher by the end of their second regular semester in Purdue University in order to continue as students in the schools of engineering; also at the end of their fourth regular semester their cumulative index shall be 3.2 or higher.

Probation. A student who fails at the end of any semester to make a passing grade in a minimum of 12 hours of work (6 hours, summer session) shall be placed upon probation. If in either of his next two sessions he fails to pass the required minimum of hours, he shall be dropped. (When failure to meet this requirement is due to the temporary grade of 0 (Incomplete), this rule shall not apply.)

The student is removed from probation if he passes 12 semester hours (6 hours, summer) for his next two sessions; or if he passes all his work (a minimum of 14 hours, or 7 hours, summer) with an average grade of 4 for one session.

A fee of $15.00 per semester will be charged for each semester that the student is on probation. (Probation fees are not chargeable to the Veterans Administration.)

Fees

Course Fees. Fees and deposits for each course are listed with the course descriptions in this catalog. In the case of 100-level courses, there are two fees shown. The smaller fee applies to students who enroll as undergraduates. Students who have completed a four-year undergraduate degree program or its equivalent are classified as graduate students and pay the higher course fee. Fees are paid to a representative of the University at the time of registration.

Veterans may enroll under the G. I. Bill, Public Law 346 or 16. Each veteran should have a letter of entitlement or certificate of authorization with him at registration. If the veteran does not have this authorization, he must prepay fees and buy books and supplies. This money will be promptly refunded as soon as the proper certificates are presented.

The veteran registering for the first time is advised to consult well in advance of registration with the Purdue officials of the Center at which he plans to register.

Breakage Fees. Course fees include the cost of normal breakage and wear and tear on equipment. An additional charge will be levied against individuals for excessive waste, loss, or breakage as may occur. Such special charges must be paid before course credit will be given.

Fees for Special Examinations. A fee of $10 is charged persons not regularly enrolled for at least 12 hours of work, for advanced-standing examinations or placement tests. A fee of $2.00 is charged students who are regularly enrolled for twelve hours or more of work for advanced-standing examinations, removal of condition, or placement tests. There is no fee for placement tests taken at regularly scheduled times. Neither is there a fee for the removal of an incomplete grade.

Refunds and Withdrawals. Course fees will be refunded under any one of the following conditions:

1. Withdrawal during first and second weeks of semester, 80 per cent refund.
2. Withdrawal during third and fourth weeks of semester, 60 per cent refund.
3. Withdrawal during fifth and sixth weeks of semester, 40 per cent refund.
4. Withdrawal after sixth week of semester, no refund.

A probation student withdrawing from all courses without grades is eligible for full refund of probation fees paid for the current semester.

Students who register for a course and do not attend class will be withdrawn as of the first day of class and entitled to a refund of eighty per cent of the course fees paid.

Deposits on equipment are subject to regular service and breakage charges.

Refunds are not transferable from one registration period to another or from one student to another.

To be eligible for a refund the student must notify the extension office and apply for a refund at the Center where he is registered at the time of his withdrawal.

Correspondence Study

Training is also given by correspondence study for high-school students and recent high-school graduates lacking certain subjects required for admission to the University or needing to refresh their knowledge of other courses in preparation for university work. Courses currently available are:

Elementary Algebra I. This course covers the first semester of high-school algebra.

Elementary Algebra II. Continuation of the first semester's work.

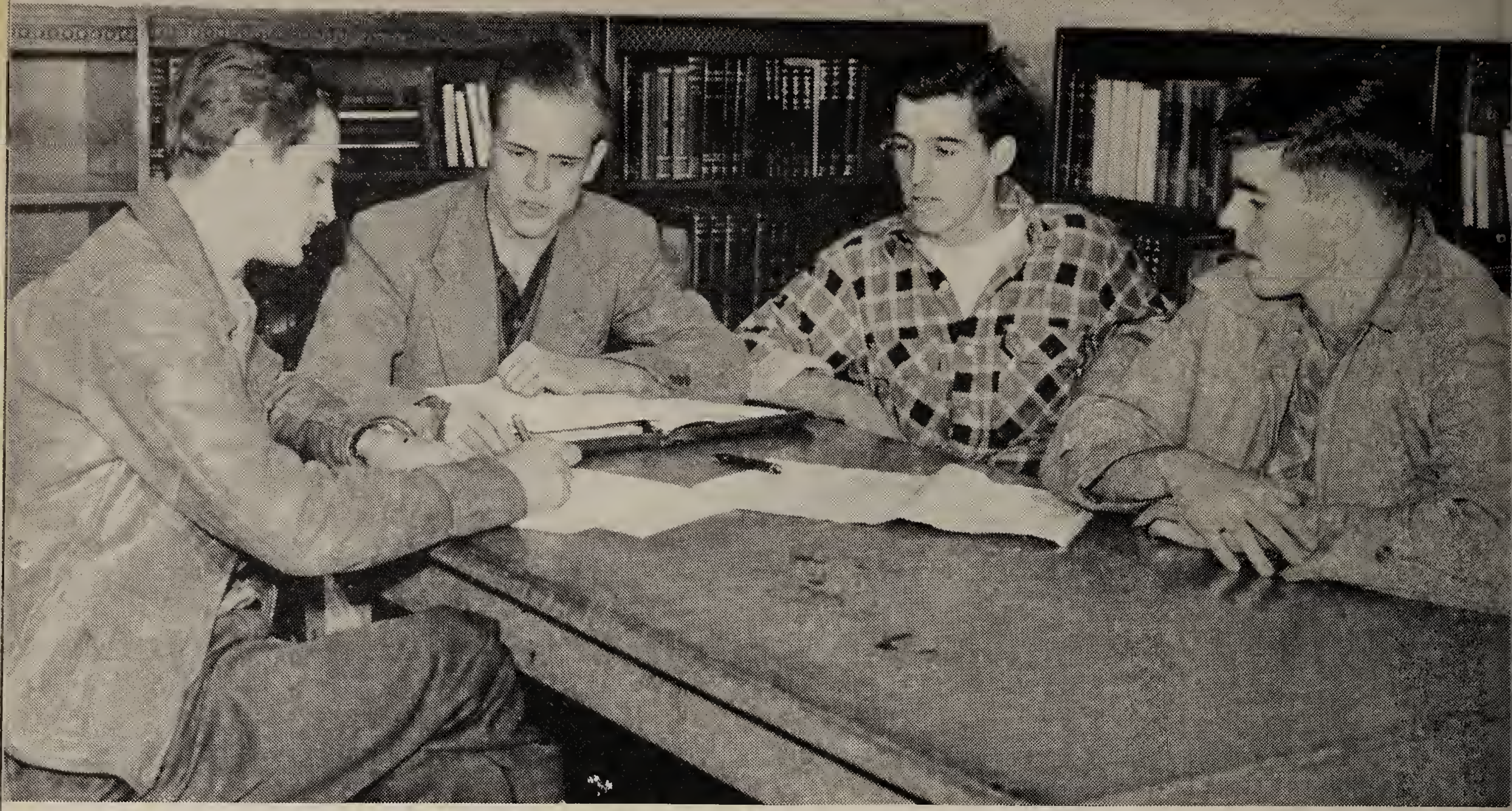
Advanced Algebra. Begins with a review of the topics studied in a basic course in algebra. In addition, the course includes linear equations, fractional and literal equations, systems of linear equations, radicals, exponents, quadratic equations, and systems of equations involving quadratics.

Plane Geometry I. This course covers the amount of geometry usually taught in the first semester.

Plane Geometry II. Continuation of the first semester's work.

Solid Geometry. Study of lines, planes, angles, prisms, cylinders, pyramids, cones, and spheres, with emphasis upon numerical problems, the drawing of space figures, and the relations of solid geometry to the mathematics given in the engineering courses at Purdue.

Plane Trigonometry. This course follows the same general plan as that taken on the campus by freshman engineers. The first part includes the use of trigonometric functions in solving triangles with either the natural values of the functions or by means of logarithms. The second part covers analytical trigonometry, including a study of identities, equation, radian measure, and inverse functions.



Center students are encouraged to participate in extracurricular activities and to formulate their own government. These men are discussing plans for a student newspaper at the Calumet Center.

Review of Pre-College Mathematics. A review of important mathematical skills essential to success in college work; fractions, decimals, percentage, the metric system, the axioms of algebra, simple equations, exponents and radicals, factoring, quadratic equations, ratio, proportion, uses of dimensional equations, and formulas of geometry.

First Aid Toward Better English. Each term at Purdue many freshmen are required, because of their deficiencies in English, to enroll in a non-credit course in grammar, punctuation, and sentence structure. This correspondence course may be the means of avoiding the non-credit course and possibly of qualifying on the orientation tests for an advanced course in English composition.

For information on correspondence study courses write to the address given on the inside front cover.

Key to Abbreviations in Freshman Programs of Study

Approved plans of study for first- and second-semester freshmen enrolled in the various schools and options are given on the following pages. Courses recommended by the schools and departments are so indicated by **bold-faced type.** The type of course as it applies to the student's plan of study for the program in which he is enrolled is indicated by the following abbreviations:

R —Required course

Rs—Required substitute, which replaces a required course listed in the general catalog.

el —Elective

op—Optional; may be substituted in place of the required course.

Freshman Plans of Study

Engineering

Undergraduate instruction in the Schools of Aeronautics, Chemical and Metallurgical Engineering, Civil Engineering and Engineering Mechanics, Electrical Engineering, and Mechanical Engineering leads to the degree of Bachelor of Science. In order to give the student sufficient time to adjust himself and to choose the branch of engineering for which he is best adapted, the following program of study during the freshman year is common for the curricula in all engineering schools.

First Semester

Course No.	Course Title	Credit	Fees	Type*
MA 1†	**Algebra and Trigonometry**	5	$35	R
ENG 1	**English Composition**	3	21	R
CHM 1	**General Chemistry**	4	38	R
HIST 5	**U. S. in World Affairs**	3	21	Rs
GE 11	**Engineering Drawing**	2	23	R
	Total	17		
PEM 12‡	Physical Activities	1	12	el
CE 6§	Plane Surveying	2	22	R
SPE 11‖	Public Speaking	2	14	Rs

Second Semester

Course No.	Course Title	Credit	Fees	Type*
MA 2†	**Analytic Geometry**	5	$35	R
ENG 27	**Introduction to Fiction**	3	21	R
CHM 2	**General Chemistry**	4	38	R
GVMT 30	**Elements of Democracy**	3	21	R
GE 12	**Engineering Drawing**	2	23	R
	Total	17		
PEM 12‡	Physical Activities	1	12	el
CE 6§	Plane Surveying	2	22	R
SPE 12‖	Public Speaking	2	14	Rs
SPE 14‖	Principles of Speech	3	21	R
PSY 1	Elementary Psychology	3	21	Rs

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* Key to abbreviations appears on page 6.

† MA 15, 11, 16 may be substituted for MA 1, 2.

‡ PEM 12 will be applied as a substitute toward credit in military training.

§ Students in Civil Engineering must have credit in CE 6 before taking CE 10 (Civil Engineering Camp).

‖ SPE 11-12 may be substituted for the SPE 14 requirement.

Science

The School of Science provides both introductory and advanced courses in the various fields of science as well as other subjects essential to a broad education, such as economics, English, government, history, modern languages, and speech. The student may fit himself for practical work in biology, chemistry, mathematics, physics, education, English, speech, history, economics, or modern languages, or for further training in a dental, medical, or law school. The instruction also prepares for teaching. Approved plans of study for the various options follow:

CHEMISTRY, PHYSICS, AND MATHEMATICS OPTIONS

First Semester

Course No.	Course Title	Credit	Fees	Type*
MA 1	**Algebra and Trigonometry**	5	$35	R
ENG 1	**English Composition**	3	21	R
SOC 1	**Introductory Sociology**	3	21	R
CHM 1†	**General Chemistry**	4	38	R
or				
PHY 21‡	**General Physics**	5	43	R
or				
BIO 5§	**Biology of Animals**	4	38	R
	Total	15 or 16		
PEM 12	Physical Activities	1	12	el
PEW 53	Physical Education	1	9	R
SPE 11‖	Public Speaking	2	14	Rs
HIST 5	U. S. in World Affairs	3	21	Rs
AD 51	Survey of the Arts	3	21	el
C&T 2	Clothing the Individual	3	21	el
GE 11	Engineering Drawing	2	23	el

Second Semester

Course No.	Course Title	Credit	Fees	Type*
MA 2	**Analytic Geometry**	5	$35	R
GVMT 30	**Elements of Democracy**	3	21	Rs
SPE 14‖	**Principles of Speech**	3	21	Rs
CHM 2†	**General Chemistry**	4	38	R
or				
PHY 22‡	**General Physics**	5	43	R
or				
BIO 6§	**Introduction to Plant Life**	4	38	R
	Total	15 or 16		

Up-to-date laboratory facilities are maintained for courses in Science such as biology, chemistry, and physics.

PEM 12	Physical Activities	1	12	el
PEW 54	Physical Education	1	9	R
SPE 12‖	Public Speaking	2	14	Rs
F&N 1	Food Selection	2	14	el
PSY 1	Elementary Psychology	3	21	el
FOR 3	Conservation	2	14	el
GE 12	Engineering Drawing	2	23	el

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* Key to abbreviations appears on page 6.

† For students majoring in chemistry.

‡ For students majoring in physics.

§ For students majoring in mathematics, except that PSY 1 may be substituted for BIO 6.

‖ Credit will not be given for both SPE 11-12 and SPE 14.

Science

BIOLOGICAL SCIENCES, PRE-PHARMACY, PRE-MEDICAL, AND PRE-DENTAL OPTIONS

First Semester

Course No.	Course Title	Credit	Fees	Type*
BIO 5	**Biology of Animals**	4	$38	R
CHM 11	**General Chemistry**	3	31	R
MA 12	**Algebra**	3	21	R
ENG 1	**English Composition**	3	21	R
ML 21†	**Beginning French**	3	21	R
or				
ML 41†	**First Course in Standard German**	3	21	R
	Total	16		
SPE 11†	Public Speaking	2	14	Rs
PEM 12	Physical Activities	1	12	el
PEW 53	Physical Education	1	9	R
HIST 5	U. S. in World Affairs	3	21	Rs
SOC 1	Introductory Sociology	3	21	el

Second Semester

Course No.	Course Title	Credit	Fees	Type*
BIO 6	**Introduction to Plant Life**	4	$38	R
CHM 12	**General Chemistry**	3	31	R
MA 11	**Trigonometry**	3	21	R
SPE 14‡	**Principles of Speech**	3	21	Rs
ML 22†	**Beginning French**	3	21	R
or				
ML 42†	**First Course in Standard German**	3	21	R
	Total	16		
SPE 12‡	Public Speaking	2	14	Rs
PEM 12	Physical Activities	1	12	el
PEW 54	Physical Education	1	9	R
GVMT 30	Elements of Democracy	3	21	Rs

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* Key to abbreviations appears on page 6.

† Those planning to major in one of the biological sciences or to enter medical or dental school should choose ML 41 and 42. Substitute GVMT 30, HIST 5, or SOC 1 where modern language is not offered. Students in the Pre-Pharmacy Option may substitute GVMT 30, HIST 5, or SOC 1 for modern language.

‡ Credit will not be given for both SPE 11-12 and SPE 14.

Science

SOCIAL SCIENCE, ENGLISH, SPEECH, AND ALL OTHER OPTIONS

First Semester

Course No.	Course Title	Credit	Fees	Type*
BIO 5	**Biology of Animals**	4	$38	Rs
GVMT 30	**Elements of Democracy**	3	21	R
ENG 1	**English Composition**	3	21	R
MA 12	**Algebra**	3	21	R
ML 21	**Beginning French**	3	21	R
or				
ML 41	**First Course in Standard German**	3	21	R
	Total	16		
SPE 11‡	Public Speaking	2	14	Rs
PEM 12	Physical Activities	1	12	el
PEW 53	Physical Education	1	9	R

Second Semester

Course No.	Course Title	Credit	Fees	Type*
PSY 1	**Elementary Psychology**	3	21	R
SOC 1	**Introductory Sociology**	3	21	R
SPE 14	**Principles of Speech**	3	21	Rs
MA 11	**Trigonometry**	3	21	Rs
ML 22	**Beginning French**	3	21	R
or				
ML 42	**First Course in Standard German**	3	21	R
	Total	15		
SPE 12‡	Public Speaking	2	14	Rs
PEM 12	Physical Activities	1	12	el
PEW 54	Physical Education	1	9	R
HIST 5	U. S. in World Affairs	3	21	Rs

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* Key to abbreviations appears on page 6.

‡ Credit will not be given for both SPE 11-12 and SPE 14.

Trade and Industrial Education

The four-year curriculum in Trade and Industrial Education which leads to the degree of Bachelor of Science in Trade and Industrial Education is designed to prepare the student to qualify in one of the following fields: (1) vocational industrial teaching, (2) industrial arts, (3) school building service, (4) industrial training. Completion of this curriculum also fulfills the professional training requirements specified by the Indiana State Teacher Training and Licensing Commission. Individuals with qualified industrial experience may request an evaluation of it for credit purposes.

In order to achieve any of these objectives, each student is required to complete a basic curriculum which includes the subjects listed below. Provision is then made for majoring in the subject matter field indicated above.

First Semester

Course No.	Course Title	Credit	Fees	Type*
MA 12	**Algebra**	3	$21	R
ENG 1	**English Composition**	3	21	R
GE 11	**Engineering Drawing**	2	23	R
HIST 5	**U. S. in World Affairs**	3	21	el
CHM 11	**General Chemistry**	3	31	R
	Total	14		
SPE 11‡	Public Speaking	2	14	Rs
ECON 1	Principles of Economics	3	21	R
PSY 1	Elementary Psychology	3	21	R

Second Semester

Course No.	Course Title	Credit	Fees	Type*
MA 11	**Trigonometry**	3	$21	R
SPE 14‡	**Principles of Speech**	3	21	R
GE 12	**Engineering Drawing**	2	23	R
SOC 1	**Introductory Sociology**	3	21	R
CHM 12	**General Chemistry**	3	31	R
	Total	14		
SPE 12‡	Public Speaking	2	14	Rs
ENG 27	Introduction to Fiction	3	21	el
ENG 31	Expository Writing	3	21	R
GVMT 30	Elements of Democracy	3	21	Rs
ECON 1	Principles of Economics	3	21	R
PSY 2	Educational Psychology	3	21	R

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* Key to abbreviations appears on page 6.

‡ Credit will not be given for both SPE 11-12 and SPE 14.

Agriculture

The School of Agriculture trains students in many types of agricultural life work, including not only farming, but related educational and industrial activities. Several programs of study are offered in Forestry. Twelve departments in the School of Agriculture offer optional programs preparing students for jobs in research, teaching and extension, as well as various related commercial enterprises. Instructional work is based on fundamental training in biology, chemistry, and physics together with courses in history, economics, English, psychology, and other similar courses.

Agricultural students who may be taking training in basic science courses together with agricultural subjects as a part of the program of training at Purdue University Centers should be able to continue their work in residence at Purdue following their freshman year.

First Semester

Course No.	Course Title	Credit	Fees	Type*
ENG 1	**English Composition**	3	$21	R
CHM 11	**General Chemistry**	3	31	R
BIO 5	**Biology of Animals**	4	38	R
AGEC 1	**Farm Accounting and Farm Business**	3	21	el
PH 1	**Poultry Production**	3	25	el
	Total	16		
MA 12	Algebra	3	21	el
CHM 1	General Chemistry	4	38	op
HIST 5	U. S. in World Affairs	3	21	el
PEM 12	Physical Activities	1	12	el

Second Semester

Course No.	Course Title	Credit	Fees	Type*
ENG 27	**Introduction to Fiction**	3	$21	el
CHM 12	**General Chemistry**	3	31	R
GVMT 30	**Elements of Democracy**	3	21	el
BIO 6	**Introduction to Plant Life**	4	38	R
FOR 3	**Conservation**	2	14	el
ENT 1	**Introductory Entomology**	3	23	el
	Total	18		
SPE 14	Principles of Speech	3	21	R
MA 11	Trigonometry	3	21	el
CHM 2	General Chemistry	4	38	op
PSY 1	Elementary Psychology	3	21	el
PEM 12	Physical Activities	1	12	el

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* Key to abbreviations appears on page 6.

Home Economics

The plan of study in Home Economics has two functions: to give the student training which will fit her to become a responsible citizen and an intelligent homemaker and housekeeper; to train her for a skilled occupation by which she may become self-supporting.

Young women trained in home economics have the opportunity to become teachers and supervisors, extension specialists, dietitians, managers of lunchrooms and tearooms, costume designers, commercial demonstrators, writers, nutrition workers, club leaders, interior decorators, and home demonstrators in extension.

Students interested in vocational home economics teaching; dietetics and nutrition; clothing and textiles; food management; costume designing, interior designing, and commercial designing; home economics in business, or the general course in home economics should enroll in the curriculum listed below. It is not recommended for those interested in the housing option.

First Semester

Course No.	Course Title	Credit	Fees	Type*
ENG 1	**English Composition**	3	$21	R
CHM 11	**General Chemistry**	3	31	R
BIO 5	**Biology of Animals**	4	38	el
AD 51	**Survey of the Arts**	3	21	R
C&T 2	**Clothing the Individual**	3	21	R
	Total	16		
MA 12	Algebra	3	21	el
HIST 5	U. S. in World Affairs	3	21	el
SPE 11‡	Public Speaking	2	14	el

Second Semester

Course No.	Course Title	Credit	Fees	Type*
ENG 27	**Introduction to Fiction**	3	$21	op
SPE 14‡	**Principles of Speech**	3	21	el
CHM 12	**General Chemistry**	3	31	R
GVMT 30	**Elements of Democracy**	3	21	el
BIO 6	**Introduction to Plant Life**	4	38	el
F&N 1	**Food Selection**	2	14	R
	Total	18		
MA 11	Trigonometry	3	21	el
PSY 1	Elementary Psychology	3	21	R
SPE 12‡	Public Speaking	2	14	el

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* Key to abbreviations appears on page 6.

‡ Credit will not be given for both SPE 11-12 and SPE 14.

Description of Courses

Courses numbered 1 to .99 are primarily for undergraduate students. Courses numbered 100 to 199 are for undergraduate (usually junior and senior) and graduate students. Courses numbered 200 and above are primarily for graduate students.

School of Agriculture

Dept. No.	Course Title	Credits	Course Fees
	AGRICULTURAL ECONOMICS		
AGEC 1	**Farm Accounting and Farm Business** 2 hours recitation, 2 hours laboratory each week. Farm financial records, analysis of farm business; factors affecting farm profits, agricultural geography; types of farming; and current problems in agricultural economics.	cr. 3	**$21.00**
AGEC 101*	**Agricultural Prices** 3 hours recitation each week. Analysis of prices of farm products; relation of prices of farm products to other prices, price and production cycles, price forecast, agricultural outlook, adjustment to new price conditions.	cr. 3	**$21.00 or $30.00**
	AGRONOMY		
AGRY 2	**Crop Production** 2 hours recitation, 2 hours laboratory each week. Fundamental principles in crop production, distribution, rotations, growth, and soil relations; grain and forage crops.	cr. 3	**$21.00**
AGRY 27	**Soil Management** 2 hours recitation, 2 hours laboratory each week; or 3 hours recitation. Must be preceded by CHM 1 or 11, or equivalent. Soil management and fertility. Designed for students taking only one course in soils.	cr. 3	**$21.00**
	ANIMAL HUSBANDRY		
AH 4	**Livestock Judging** 1 hour recitation, 4 hours laboratory each week. Beef cattle and horses. Scoring of individuals and judging of groups representing the more common classes and grades from the standpoint of the market and the producer.	cr. 3	**$21.00**
AH 7	**Livestock Judging** 1 hour recitation, 4 hours laboratory each week. Swine and sheep. Similar to AH 4.	cr. 3	**$21.00**
AH 11	**Types and Market Classes of Meat Animals** 2 hours recitation, 4 hours laboratory each week. Selection of feeder and breeding stock suitable for production of desirable market beef cattle, hogs, and lambs. The marketing, slaughtering, and processing of meat animals.	cr. 4	**$28.00**

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* May be offered upon request of not less than twenty registered students provided the teaching staff is available.

AH 25 **Animal Nutrition** cr. 3 **$21.00**

3 hours recitation each week.
Must be preceded by CHM 2 or 12, or equivalent.
Fundamental principles of animal nutrition.

AH 108* **Genetics** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.
Must be preceded by BIO 2 or 6.
Principles of genetics and their relation to the problems of plant and animal breeding.

DAIRY HUSBANDRY

DH 1 **Elements of Dairy Production** cr. 3 **$21.00**

2 hours recitation, 2 hours laboratory each week.
Survey of the industry; fundamentals of raising, managing, selecting, and feeding dairy cattle; care of milk and cream on the farm; milk and cream testing; dairy judging.

DH 17 **Elements of Dairy Manufactures** cr. 3 **$21.00**

2 hours recitation, 2 hours laboratory each week.
Methods of manufacturing dairy products; buttermilk, skim milk and whey testing; standardization of milk and cream; care and operation of cream separators.

ENTOMOLOGY

ENT 1 **Introductory Entomology** cr. 3 **$23.00**

2 hours recitation, 2 hours laboratory each week.
The structure, biology, and classification of insects, and the principles of insect control.

FORESTRY

FOR 3 **Conservation** cr. 2 **$14.00**

2 hours recitation each week.
Development and use of natural resources, with special emphasis on renewable natural resources.

HORTICULTURE

HORT 1 **Plant Propagation** cr. 2⅔ **$21.00**

2 hours recitation, 2 hours laboratory each week.
Principles, with special reference to greenhouse and ornamental plants.

HORT 11 **Principles of Fruit Growing** cr. 3 **$21.00**

2 hours recitation, 2 hours laboratory each week.
Care and management of small home plantings of trees and small fruits; reclamation of old orchards; control of common fruit pests.

HORT 12 **Principles of Vegetable Gardening** cr. 3 **$21.00**

2 hours recitation, 2 hours laboratory each week.
A beginning course in the production of vegetables. Designed especially for the home gardener.

HORT 29* **General Horticulture** cr. 3 **$21.00**

3 hours recitation each week.
Of special interest to students who want one 2-credit or one 3-credit course in the various fields of horticulture. Not to be taken by students who have credit in HORT 11, 12, 27, or 28.

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* May be offered as a two-credit course with special approval.

POULTRY HUSBANDRY

PH 1 **Poultry Production** cr. 3 **$21.00**

2 hours recitation, 2 hours laboratory each week.
Breeds, breeding, incubation, brooding, feeding, marketing, disease control and sanitation. Laboratory involving practical skills and tasks with poultry.

School of Aeronautical Engineering and Air Transportation

AT 22 **Air Navigation** cr. 2 **$14.00**

2 hours recitation each week.
Must be preceded by MA 1, or equivalent.
The earth and its coordinates; charts and maps; elementary theory and practice of pilotage and dead reckoning; use of navigational instruments and computer.

AT 31 **Aeronautical Meteorology** cr. 2 **$14.00**

2 hours recitation each week.
Must be preceded by MA 1, or equivalent.
Weather in relation to flight.

Non-Credit Courses

AT 08 **Practical Aeronautics**

32 hours recitation, non-credit **$16.00**

A course of practical flying problems. The complete airplane and its operation, including maintenance, starting and stopping the engine, taxiing and flight problems. Practical rules concerning weather problems; government weather services. Air navigation aids and instruments; chart reading and navigation by pilotage and elementary dead-reckoning with application to actual problems.

School of Chemical and Metallurgical Engineering and Geology

CHEMICAL ENGINEERING

CHE 30 **Chemistry of Engineering Materials** cr. 3 **$21.00**

3 hours recitation each week.
Must be preceded by CHM 1, or equivalent.
Available for students of any classification not enrolled in chemical engineering.

CHE 40 **Chemical Engineering Calculations** cr. 2 **$21.00**

6 hours laboratory each week.
Must be preceded by CHM 2, or equivalent, and accompanied or preceded by MA 3 and PHY 21.

CHE 41* **Unit Operations** cr. 2 **$14.00**

2 hours recitation each week.
Must be preceded by CHE 40 and METE 2, or permission of instructor.
A quantitative study of fluid flow, heat transfer, evaporation, etc., with special consideration of problems in design.

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* May be offered as a two-credit course with special approval.

CHE 128 **Chemical Process Industries** cr. 3 **$21.00 or $30.00**
3 hours recitation each week.
Must be preceded or accompanied by CHM 151 and CHM 173.
Applications of unit operations, unit processes, and flow sheets.

CHE 129 **Chemical Process Industries** cr. 3 **$21.00 or $30.00**
3 hours recitation each week.
Continuation of CHE 128.

CHE 137 **Unit Operations** cr. 3 **$21.00 or $30.00**
3 hours recitation each week.
Must be preceded by CHE 40 and preceded or accompanied by CHM 173.
Quantitative problems in the operation of chemical process equipment including fluid flow, heat transfer, evaporation, drying, distillation, etc. Special emphasis on design calculations.

CHE 138 **Unit Operations** cr. 3 **$21.00 or $30.00**
3 hours recitation each week.
Must be preceded by CHE 40 and preceded or accompanied by CHM 174.
A continuation of CHE 137.

Non-Credit Courses

CHE 001 **Chemical Technology**
16 hours recitation, non-credit **$ 8.00**
Must be preceded by CHM 001, or equivalent.
Uses, preparation, and transportation of acids, bases, metals, and gases of importance to industry.

CHE 002 **Water Technology** 16 hours recitation, non-credit **$ 8.00**
Must be preceded by CHM 001, or equivalent.
Consideration of water purification, softening, and waste disposal.

CHE 003 **Fuel Technology** 16 hours recitation, non-credit **$ 8.00**
Must be preceded by CHM 001 and CHM 002, or equivalent.
Consideration of sources of industrial energy—coal, oil, gas, atomic energy, solar energy, water-power; flue gas analysis.

CHE 004 **Petroleum Technology**
16 hours recitation, non-credit **$ 8.00**
Must be preceded by CHM 003, or equivalent.

CHE 005 **Plastic Technology** 16 hours recitation, non-credit **$ 8.00**
Must be preceded by CHM 003, or equivalent.
Plastics and their uses. Thermo-plastics, thermo-setting plastics, rubber, nylon, and others.

CHE 040 **Chemical Engineering Calculations**
64 hours laboratory, non-credit **$16.00**
Student must have a working knowledge of differential calculus and college physics.

CHE 061 **Distillation Processes (Petroleum)**
32 hours recitation, non-credit **$16.00**
Must be preceded by CHM 53, 54 (Organic Chemistry), or equivalent.
An opportunity for qualified personnel of the oil industry to study the fundamental theory of operating procedures and general practices of petroleum distillation design. A review of fundamental physical chemistry laws followed by an introduction to the applications of distillation to the petroleum refinery industry.

CHE 062 **Filtration Operations**

32 hours recitation, non-credit **$16.00**

Must be preceded by a working knowledge of CHE 137, or equivalent, gained by college-level courses or industrial experience.
Theory and design of filtration apparatus.

CHE 063 **Elementary Photography**

16 hours recitation, 32 hours laboratory,
non-credit **$19.00**

Essential fundamentals of photographic chemistry, optics, sensitive materials and their uses; composition, lighting, and the selection of suitable cameras and equipment for specific uses.

CHE 063a **Elementary Photography**

8 hours recitation, 8 hours laboratory,
non-credit **$ 7.00**

Selected topics from CHE 063.

CHE 063b **Elementary Photography**

8 hours recitation, 8 hours laboratory,
non-credit **$ 7.00**

Selected topics from CHE 063.

CHE 063c **Elementary Photography**

8 hours recitation, 8 hours laboratory,

Selected topics from CHE 063.

non-credit **$ 7.00**

CHE 064 **Photography: Recent Developments**

8 hours recitation, 8 hours laboratory,
non-credit **$ 7.00**

Must be preceded by CHE 063, or equivalent.

ENGINEERING AND ECONOMIC GEOLOGY

GEOL 3 **Physical Geology** cr. 3 **$21.00**

3 hours recitation each week.
Earth forces, processes, and resulting features.

GEOL 4 **Stratigraphic and Structural Geology** cr. 3 **$21.00**

3 hours recitation each week.
Must be preceded by GEOL 3, 44, or equivalent, with a grade of 4 or better.
Brief synopsis of historical geology, with emphasis on stratigraphic and structural relationships.

METALLURGICAL ENGINEERING

METE 44 **General Metallurgy** cr. 2 **$14.00**

2 hours recitation each week.
Must be preceded by CHM 2 and 26, or equivalent. Primarily for metallurgical engineers.

METE 45 **Elementary Metallurgy** cr. 3 **$21.00**

3 hours recitation each week.
Must be preceded by CHM 2 and PHY 22, or equivalent.
Primarily for non-metallurgical engineers.

METE 123 **Ferrous Metallurgy** cr. 3 **$21.00 or $30.00**
3 hours recitation each week.
Must be preceded by METE 44 or equivalent.

METE 219 **Theoretical Physical Metallurgy** cr. 3 **$30.00**
3 hours recitation each week.
Must be preceded by METE 149, 151, and 152, or equivalent.
Newer theories of the metallic state, interpretation of experimental data, recent experimental developments of future significance.

Non-Credit Courses

METE 001 **Steel Making** 16 hours recitation, non-credit **$ 8.00**
Production methods in steel making.

METE 045 **Elementary Metallurgy** 16 hours recitation, non-credit **$ 8.00**
Must be preceded by CHM 001, or equivalent.
General survey of elementary metallurgy.

METE 045a **Ferrous Metallurgy** 16 hours recitation, non-credit **$ 8.00**
Must be preceded by METE 045, or equivalent.
Fundamentals of the reduction, refining, and shaping of ferrous alloys.

METE 045b **Non-ferrous Metallurgy** 16 hours recitation, non-credit **$ 8.00**
Must be preceded by METE 045, or equivalent.
Fundamental principles involved in the reduction and refining of some of the non-ferrous metals.

METE 045c **Physical Metallurgy** 16 hours recitation, non-credit **$ 8.00**
Must be preceded by METE 045, or equivalent.
Basic principles with emphasis on heat treating.

School of Civil Engineering and Engineering Mechanics

CIVIL ENGINEERING

CE 6 **Plane Surveying** cr. 2 **$21.00**
1 hour recitation, 3 hours laboratory each week.
Must be preceded by MA 11 or equivalent.

CE 17 **Railroads** cr. 2 **$21.00**
1 hour recitation, 3 hours laboratory each week.
Must be preceded by CE 10, Civil Engineering camp.
Quantities, cost data, monthly and final estimates; problems in frogs, switches, curves, and transition spirals; maintenance.

CE 21 **Stresses** cr. 5⅓ **$44.00**
4 hours recitation, 4 hours laboratory each week.
Must be preceded by EM 21.
Analysis of statically determinate structures; reactions, shears, bending moments, and direct stresses due to fixed and moving loads; beams and framed structures.

CE 23 **Fundamentals of Structural Design** cr. 3 **$26.00**

2 hours recitation, 3 hours laboratory each week.
Must be preceded by EM 21 and 22.
Proportioning and disposition of structural elements in simple structures.

CE 41 **Hydraulics** cr. 3 **$21.00**

3 hours recitation each week.
Must be preceded by EM 21.
Pressure on submerged surfaces; flow of fluids; dynamics of flow; models.

CE 61 **Highway Construction** cr. 2 **$18.00**

1 hour recitation, 3 hours laboratory each week.
Must be preceded by CE 10, Civil Engineering camp.
Location, earthwork, drainage, design, contract procedure, and maintenance.
Particular emphasis on low cost roads.

CE 62 **Highway Construction** cr. 2 **$14.00**

2 hours recitation each week.
Must be preceded by EM 22.
Materials, design, construction, and maintenance of bituminous, concrete, and block types of roads and streets; sub-grade stabilization; administration and finance; and comparative values of road surface types.

CE 71 **Indeterminate Stresses** cr. 3 **$21.00**

3 hours recitation each week.
Must be preceded by CE 21 and EM 22.
A thorough drill in computing deflections of beams and trusses; indeterminant analysis of moment areas, consistent deflections, slope deflection, and moment distribution.

ENGINEERING MECHANICS

EM 21 **Statics and Kinetics** cr. 5 **$35.00**

5 hours recitation each week.
Must be preceded by PHY 1 or 21 and preceded or accompanied by MA 4.
Statics: forces, vectors, moments, equilibrium, friction, centers of gravity, moments of inertia. Kinetics: force, mass, acceleration, velocity, inertia, work, energy, power, impulse, and momentum.

EM 22 **Mechanics of Materials** cr. 4 **$28.00**

4 hours recitation each week.
Must be preceded by EM 21 and MA 4.
Stresses and strain: properties of materials; riveted and welded joints; torsion; shear and moment; bending and deflection of beams; statically indeterminate beams; combined stresses; and columns.

EM 31 **Strength of Materials** cr. 3 **$21.00**

3 hours recitation each week.
Must be preceded by EM 22, and CE 31 (Testing Materials) or CE 35 (Engineering Materials).
Strength of materials as such; true stress-strain relations; elastic strength; flow strength; fracture strength; the effects of state of stress, temperature, speed of loading, cycles of loading, duration of load, and previous history of the materials.

EM 32 **Dynamics** cr. 3 **$21.00**

3 hours recitation each week.
Must be preceded by EM 22 or 23.
Relative motions acceleration, velocity and displacements for compound motions; impulse, momentum, work and energy for particles, rigid bodies, and elastic bodies; impact; critical speed; gyroscopic effects.

School of Electrical Engineering

EE 42c **Electric Circuit Theory** cr. 3 **$21.00**

3 hours recitation each week.
Must be preceded by EE 3a (Alternating Current Circuits I) or equivalent.
Basic electric theory, network theorems.

EE 150c **Advanced Electronics** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.
Electronic theory and tube design.

EE 161 **Illuminating Engineering** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.
Must be preceded by EE 3a (Alternating Current Circuits I) or equivalent.
Lamp characteristics, illumination measurements and calculations, lighting applications and costs.

EE 134 **Power Transmission and Distribution** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.
Must be preceded by EE 5a, or 20 (Electrical Engineering-AC) or equivalent.
Methods and materials used in design and construction of overhead power lines.

EE 183 **Automatic Control Mechanisms** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.
Must be preceded by EE 5a (Alternating Current Machines) or 20, and 51 (Electronics II).
Fundamental physical and mathematical principles of servo and other automatic control mechanisms.

EE 188 **Symmetrical Components** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.
Must be preceded by EE 4a (Alternating Current Circuits II).
Theory and applications; solutions of unbalanced circuits.

Non-Credit Courses

EE 03a **Electric and Magnetic Circuit Theory, Part I**
16 hours recitation, non-credit **$ 8.00**

Must be preceded by a working knowledge of direct- and alternating-current circuit theory.
Basic units and laws; alternating current; impedance, inductive and capacitive reactance; resistance; inductance—self and mutual.

EE 03b **Electric and Magnetic Circuit Theory, Part II**
16 hours recitation, non-credit **$ 8.00**

Must be preceded by EE 03a, or equivalent.
Transformers and reactors; capacitance; polyphase systems; vacuum tubes; schematic diagrams of circuits.

EE 04a **Electric Circuit Analysis, Part I**
16 hours recitation, non-credit **$ 8.00**

Continuation of EE 03b (Electric and Magnetic Circuit Theory).

EE 04b **Electric Circuit Analysis, Part II**

16 hours recitation, non-credit **$ 8.00**

Continuation of EE 04a.

EE 016 **Wiring Standards and Code Specifications**

32 hours recitation, non-credit **$16.00**

Must be preceded by a working knowledge of direct- and alternating-current circuits.
The technical and legal aspects of electrical standards and specifications for indoor, underground, and overhead electrical construction and equipment.

EE 017 **Electrical Measurements: Direct Current**

32 hours recitation, non-credit **$16.00**

Must be preceded by a working knowledge of direct- and alternating-current circuits.
D. C. instruments, bridges, potentiometers, and magnetic measurements.

EE 018 **Electrical Measurements: Alternating Current**

32 hours recitation, non-credit **$16.00**

Must be preceded by a working knowledge of direct- and alternating-current circuits.
A. C. indicating instruments and bridges, oscillographs, and radio frequency measurements.

EE 052 **Industrial Electronic Control**

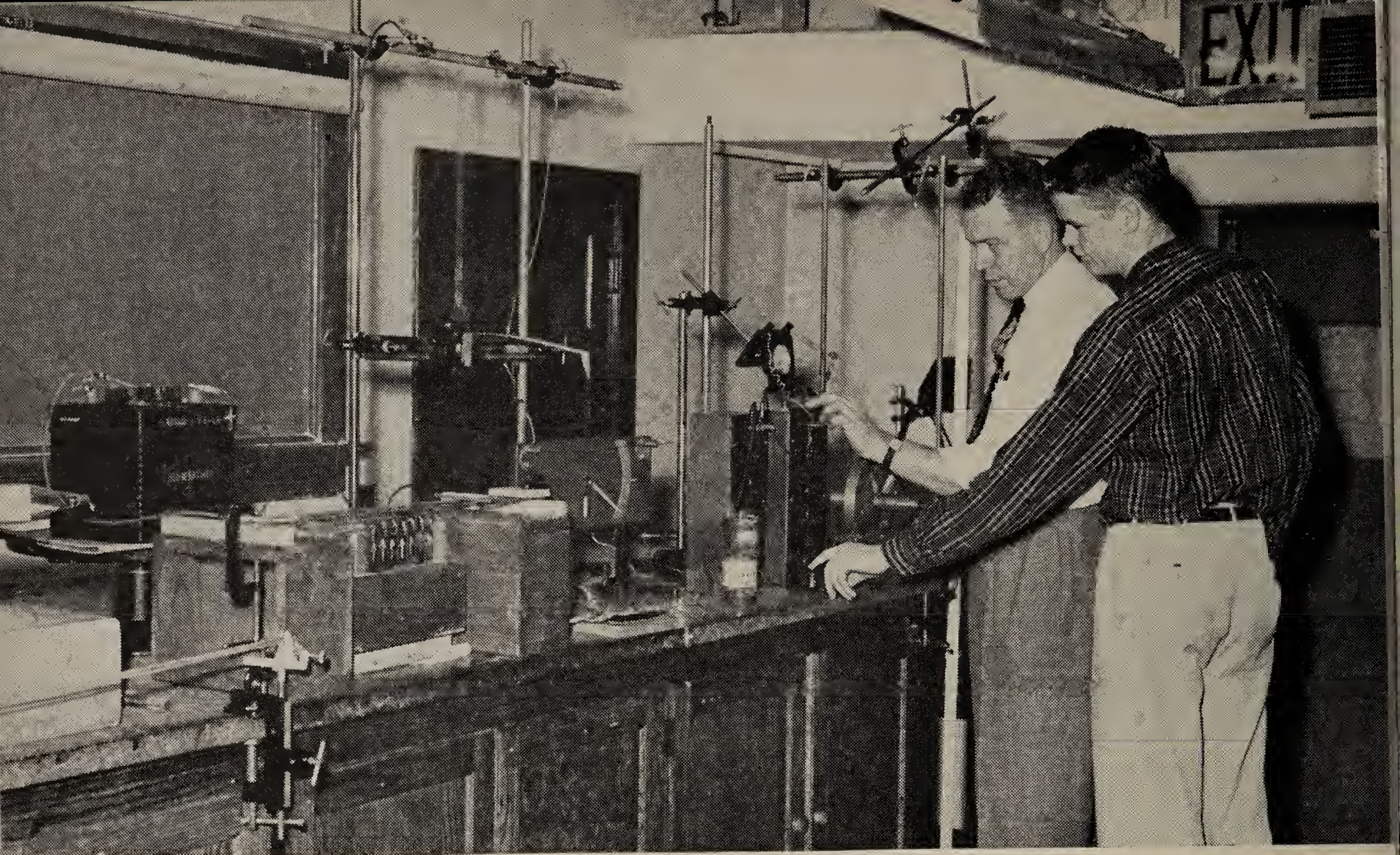
32 hours recitation, non-credit **$16.00**

High-school graduation, including two years of mathematics and one year of physics, or equivalent.
Fundamental principles of electron-tube operation and practical applications of these electron tubes in basic circuits of industrial control apparatus.

EE 061 **Fundamentals of Illumination**

32 hours recitation, non-credit **$16.00**

Must be preceded by a working knowledge of alternating-current circuits.
General principles of domestic and commercial illumination.



An instructor-demonstration of the laboratory assignment makes the laboratory work more understandable to the student.

Practice in making drawings from simulated design problems prepares the engineering student for many technical jobs.

Department of General Engineering

GE 11 **Engineering Drawing** cr. 2 **$23.00**

1 hour recitation, 4 hours laboratory each week.

Preparation of drawings from simulated engineering sketches and specifications, necessitating practical reasoning. Drawing made freehand and with instruments emphasing orthographic projection, dimensioning, lettering, and pencil and ink tracing.

A student transferring from another college or university may be granted credit for previous engineering drawing.

A student who has had two years of high school drawing or equivalent industrial drafting experience may be given credit for GE 11, on the basis of an examination given at the time of the regular orientation examinations.

A student may qualify for credit in GE 12 by submitting acceptable samples of his drafting work done in industry accompanied by a letter from his employer, indicating the nature and duration of his service.

Credentials for advanced standing must be submitted in advance of registration.

GE 12 **Engineering Drawing** cr. 2 **$23.00**

1 hour recitation, 4 hours laboratory each week.
Continuation of GE 11. Developments and intersections, isometric and oblique drawings, fasteners, and assembly and detail working drawings.

GE 16 **Descriptive Geometry** cr. 2 **$19.00**

1 hour recitation, 3 hours laboratory each week.
Must be preceded by GE 12 and MA 2 (or MA 11, for non-engineers).
Relations of points, lines, and planes, and their graphical and algebraic representations; graphical solutions, and associations with algebraic solutions of theoretical and practical problems.

GE 21 **Production Illustration** cr. 2 **$24.00**

6 hours laboratory each week.
Perspective, detail, sectioned, phantom, and exploded assembly drawing; light and shade, dimensioning, and techniques, all as applied to catalog and production illustration.

GE 89 **Industrial Safety** cr. 3 **$21.00**

3 hours recitation each week.
Safety methods in industry. Safety codes, compensations, inspection, safety educational program, industrial facilities to care for injured workmen, health hazards and protective measures, safeguards on equipment and buildings to prevent accidents.

GE 91* **Elements of Accounting I** cr. 3 **$21.00**

3 hours recitation each week.
Students must have at least junior standing.
Basic principles of accounting for assets, liabilities, and net worth. Financial transactions analyzed in terms of their significance in the preparation and interpretation of financial statements.

GE 92 **Elements of Accounting II** cr. 3 **$21.00**

3 hours recitation each week.
Must be preceded by GE 91.
Continuation of basic accounting principles including special features of accounting for partnerships, corporation capital stock and surplus, funds and reserves, cash and stock dividends, methods of internal check, consignments, and analysis of comparative financial statements.

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* May be offered as a two-credit course with special approval.

GE 98 **Industrial Organization and Management** cr. 3 **$21.00**

3 hours recitation each week.

Students must have at least junior standing.

Principles of organization and management in their application to product and process planning, plant layout, production control, quality control, motion and time study, industrial relations, marketing and cost analysis.

GE 107 **Industrial Personnel Administration** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.

Must be preceded by GE 98.

Personnel administrative functions of job analysis, recruitment, selection and placement, training and employee services.

GE 117* **Industrial Relations** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.

Must be preceded by GE 98, or equivalent.

Management of manpower, wage administration, employment stabilization, and collective bargaining.

GE 127 **Cost Accounting** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.

Must be preceded by GE 91.

Accounting for costs of labor and material, expense distribution, standard costs and flexible budgets, from viewpoint of the industrial supervisor who uses cost reports to control activities for which he is responsible.

GE 128 **Motion and Time Study** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.

Students must have at least junior standing.

Techniques of motion and time study and their interrelationships. Basic procedure, possibility guides, process analysis, operation analysis, micromotion analysis, and stop-watch time study, multiple-activity analysis.

GE 129 **Advanced Motion and Time Study** cr. 3 **$26.00 or $35.00**

3 hours recitation each week.

Must be preceded by GE 128.

Formulation of industrial policies for the application of motion and time study. Practice in construction of standard times and synthetic rates. Micromotion technique applied to industrial problems.

GE 183 **Production Planning** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.

Must be preceded by GE 98 and GE 35.

Planning for production; methods and part analysis for foundry and metal-working industries; operation and routing sheets; bills of materials, cost estimating, product design and development.

GE 184 **Tool Design** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.

Must be preceded by GE 35 (Shop Laboratory; Machine Tool Work), and ME 66 or 67 (Machine Design).

Economics of tool engineering, tooling programs, design of jigs, fixtures, and dies for production.

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* May be offered as a two-credit course with special approval.

GE 185 **Production Control** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.
Must be preceded by GE 183.
Basic consideration of methods for the control of production in manufacturing plants; planning and scheduling of production from route sheets and part specifications for casting and processing of parts in metal-working industries.

GE 186 **Plant Layout** cr. 3 **$30.00 or $36.00**

2 hours recitation, 4 hours laboratory each week.
Must be preceded by GE 183.
Design of a complete manufacturing plant; foundry, machine shop, assembly, and all allied departments. A selected production of definite quality is planned for a given volume of output, starting from the drawings, parts, or assembled units.

GE 195 **Wage Administration** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.
Must be preceded by GE 98, 107 or 117, and 128, or equivalent.
Job analysis, job description, job evaluation, wage payment plans.

GE 196 **Wage Incentives** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.
Must be preceded by GE 98, 107 or 117, and 128, or equivalent.
Characteristics and application of wage incentive systems.

GE 197 **Job Evaluation** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.
Must be preceded by GE 98, 107 or 117, and 128, or equivalent.
Characteristics and applications of job evaluation systems.

Non-Credit Courses

GE 01 **Introductory Drawing**

48 hours laboratory, non-credit **$15.00**

Multi-view and pictorial sketching and dimensioning; use of drafting instruments and geometrical constructions; sections; screw threads; auxiliary views; assembly drawing.

GE 01a **Introductory Drawing, Part I**

16 hours laboratory, non-credit **$ 5.00**

Multi-view drawing and pictorial sketching; dimensioning.

GE 01b **Introductory Drawing, Part II**

16 hours laboratory, non-credit **$ 5.00**

Continuation of topics in GE 01a; use of drafting instruments and geometrical construction; sections.

GE 01c **Introductory Drawing, Part III**

16 hours laboratory, non-credit **$ 5.00**

Continuation of topics in GE 01b; screw threads; auxiliary views; assembly drawing.

GE 01d **Introductory Drawing, Part IV**

16 hours laboratory, non-credit **$ 5.00**

General overview of the topics in GE 01.

GE 03 **Building Plan Reading**

48 hours laboratory, non-credit **$15.00**

Drafting and building terminology, dimensioning practices, material representation and plan symbols, elevation and plan layouts, detail sections, large-scale and full-size details, notes and specifications, building codes.

GE 03a **Building Plan Reading, Part 1**

16 hours laboratory, non-credit **$ 5.00**

Drafting and building terminology, dimensioning practices, material representation and plan symbols, elevation and plan layouts.

GE 03b **Building Plan Reading, Part II**

16 hours laboratory, non-credit **$ 5.00**

Continuation of topics in GE 03a; detail sections, large-scale and full-size details.

GE 03c **Building Plan Reading, Part III**

16 hours laboratory, non-credit **$ 5.00**

Continuation of topics in GE 03b; notes and specifications.

GE 03d **Building Plan Reading, Part IV**

16 hours laboratory, non-credit **$ 5.00**

General overview of the topics in GE 03.

GE 04 **Plan Reading: Machine**

48 hours laboratory, non-credit **$15.00**

Use of scales, drafting and terminology, dimensioning practices, screw-thread representation, multi-view drawings, isometric sketching, sections, auxiliary views, gears.

GE 04a **Plan Reading: Machine, Part I**

16 hours laboratory, non-credit **$ 5.00**

Introduction to use of scales, drafting and shop terminology, dimensioning, screw-thread representation, multi-view drawing, isometric sketching.

GE 04b **Plan Reading: Machine, Part II**

16 hours laboratory, non-credit **$ 5.00**

Continuation of topics in GE 04a; section views.

GE 04c **Plan Reading: Machine, Part III**

16 hours laboratory, non-credit **$ 5.00**

Continuation of topics in GE 04b; auxiliary views and gears.

GE 04d **Plan Reading: Machine, Part IV**

16 hours laboratory, non-credit **$ 5.00**

General overview of the topics in GE 04.

GE 007 **Industrial Personnel Administration**

48 hours recitation, non-credit **$24.00**

Elementary principles of industrial personnel administration.

GE 017 **Industrial Relations**

48 hours recitation, non-credit **$24.00**

Fundamentals of employer-employee relations.

GE 027 **Cost Accounting**

48 hours recitation, non-credit **$24.00**

Must be preceded by GE 091 or equivalent.
Elementary methods of accounting for direct and indirect costs in production.

GE 061a **Quality Control by Statistical Methods, Part I**

32 hours recitation, non-credit **$16.00**

Sampling techniques and the application of statistical data to the control of industrial production.

GE 061b **Quality Control by Statistical Methods, Part II**

32 hours recitation, non-credit **$16.00**

Continuation of GE 061a.

GE 061c **Quality Control by Statistical Methods, Part III**

32 hours recitation, non-credit **$16.00**

Continuation of GE 061b.

GE 063 **Wage Incentive Methods**

32 hours recitation, non-credit **$16.00**

Must be preceded by industrial experience with wage problems.
Comparative study of various wage incentive plans.

GE 064 **Principles of Inspection**

24 hours laboratory, non-credit **$ 8.00**

Functions and objectives of inspection; standards and terminology; equipment; sources and interpretation of data; duties and responsibilities of specific job assignments.

GE 065 **Precision Measurements in the Machine Industry**

24 hours laboratory, non-credit **$ 8.00**

Inspection methods, measuring instruments and their use in control of mass production.

GE 066 **Fundamentals of Work Simplification**

32 hours recitation, non-credit **$16.00**

Elementary theory and practice of work simplification. Basic techniques of motion study, process and operation charts, micromotion study, and motion economy.

GE 067 **Fundamentals of Time Study**

32 hours recitation, non-credit **$16.00**

Elementary theory and practice of time study. Stop-watch time study; synthetic time standards, rating, fatigue and allowances.

GE 080 **Job Instruction**

16 hours recitation, non-credit **$ 8.00**

Analysis and use of job instruction methods.

GE 081 **Job Methods**

16 hours recitation, non-credit **$ 8.00**

Basic methods for work simplification.

GE 082 **Job Relations**

16 hours recitation, non-credit **$ 8.00**

The worker in his job.

GE 083	**Production Planning**	48 hours recitation, non-credit	$24.00
GE 083a	**Production Planning, Part I: Manufacturing Methods**	16 hours recitation, non-credit	$ 8.00
GE 083b	**Production Planning, Part II: Process Engineering**	16 hours recitation, non-credit	$ 8.00
GE 083c	**Production Planning, Part III: Designing for Production**	16 hours recitation, non-credit	$ 8.00
GE 084	**Tool Design**	96 hours laboratory, non-credit	$28.00
GE 084a	**Tool Design, Part I: Cutting Tools**	24 hours laboratory, non-credit	$ 7.00
GE 084b	**Tool Design, Part II: Jigs**	24 hours laboratory, non-credit	$ 7.00
GE 084c	**Tool Design, Part III: Fixtures**	24 hours laboratory, non-credit	$ 7.00
GE 084d	**Tool Design, Part IV: Dies**	24 hours laboratory, non-credit	$ 7.00
GE 085	**Production Control**	48 hours recitation, non-credit	$24.00
GE 085a	**Production Control, Part I: Materials Handling and Control**	16 hours recitation, non-credit	$ 8.00
GE 085b	**Production Control, Part II: Production Routing and Scheduling**	16 hours recitation, non-credit	$ 8.00
GE 085c	**Production Control, Part III: Production Dispatching and Follow-up**	16 hours recitation, non-credit	$8.00
GE 086	**Industrial Plant Layout**	96 hours laboratory, non-credit	$28.00
GE 086a	**Industrial Plant Layout, Part I: Continuous Production**	48 hours laboratory, non-credit	$14.00
GE 086b	**Industrial Plant Layout, Part II: Intermittent Production**	48 hours laboratory, non-credit	$14.00
GE 089	**Industrial Safety** Basic principles of industrial safety.	32 hours recitation, non-credit	$16.00
GE 089a	**Industrial Safety, Part 1**	16 hours recitation, non-credit	$ 8.00
GE 089b	**Industrial Safety, Part II** Continuation of GE 089a.	16 hours recitation, non-credit	$ 8.00

GE 091 **Elements of Accounting**
48 hours recitation, non-credit **$24.00**
Elementary principles of accounting.

GE 091a **Elements of Accounting, Part 1**
16 hours recitation, non-credit **$ 8.00**

GE 091b **Elements of Accounting, Part II**
16 hours recitation, non-credit **$ 8.00**
Continuation of GE 091a.

GE 091c **Elements of Accounting, Part III**
16 hours recitation, non-credit **$ 8.00**
Continuation of GE 091b.

GE 091d **Elements of Accounting, Part IV: Income Tax Problems**
8 or 16 hours recitation, non-credit **$4.00 or $ 8.00**

GE 097 **Job Evaluation** 32 hours recitation, non-credit **$16.00**
Comparative study of various job evaluation systems.

GE 098 **Industrial Organization and Management**
48 hours recitation, non-credit **$24.00**

The attack on a design problem is preceded by a chalk talk.

School of Mechanical Engineering

ME 11 **Mechanism** cr. 3 **$26.00**

2 hours recitation, 3 hours laboratory each week.
Must be preceded by EM 21 and ME 5 (Mechanical Engineering Equipment Laboratory), or equivalent.
Motions and velocities of machine parts.

ME 29 **Elementary Heat Power** cr. 3 **$21.00**

3 hours recitation each week.
Must be preceded by PHY 21 and MA 3.
Fuels and combustion, internal combustion engines, steam generation, turbines, heat exchanges, fans and pumps.

ME 40 **Thermodynamics** cr. 3 **$21.00**

3 hours recitation each week.
Must be preceded by ME 29, MA 4 and ME 5, or equivalent.
First law: properties of liquids and gases; energy effects for gas and vapor changes; second law: entropy; flow of fluids.

ME 41 **Thermodynamics** cr. 3 **$21.00**

3 hours recitation each week.
Continuation of ME 40. Gas-vapor mixtures, combustion, gas and vapor cycles, compressors, refrigeration, heat transfer.

ME 65 **Dynamics of Machinery** cr. 3 **$26.00**

2 hours recitation, 3 hours laboratory each week.
Must be preceded by credit in ME 11 and EM 21.
Velocities, accelerations, working and inertia forces in machine parts.

ME 66 **Machine Design** cr. 5 **$45.00**

3 hours recitation, 6 hours laboratory each week.
Must be preceded by credit in ME 65 and EM 22.
Proportioning of machine parts according to laws of mechanics, with attention to function, production, and economic factors; design of a machine.

Non-Credit Courses

ME 015 **Elementary Heat Transfer***

48 hours recitation, non-credit **$24.00**
Elementary principles of heat transfer and their application to industry.

ME 015a **Elementary Heat Transfer, Part I***

32 hours recitation, non-credit **$16.00**
Selected topics from ME 015.

ME 015b **Elementary Heat Transfer, Part II***

32 hours recitation, non-credit **$16.00**
Selected topics from ME 015.

ME 016 **Refrigeration*** 48 hours recitation, non-credit **$24.00**

Basic principles of refrigeration and their application to the installation, operation, and maintenance of refrigeration equipment.

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* The student must have a working knowledge of algebraic concepts and basic principles of physics.

ME 016a **Refrigeration, Part I***
16 hours recitation, non-credit $ 8.00
Selected topics from ME 016.

ME 016b **Refrigeration, Part II***
32 hours recitation, non-credit $16.00
Selected topics from ME 016.

ME 017 **Heating and Ventilating***
48 hours recitation, non-credit $24.00
Types of heating systems, heating transmission and installation, fans and ducts, and auxiliary equipment.

ME 017a **Heating and Ventilating, Part I***
16 hours recitation, non-credit $ 8.00
Selected topics from ME 017.

ME 017b **Heating and Ventilating, Part II***
32 hours recitation, non-credit $16.00
Selected topics from ME 017.

ME 018 **Steam Power Plant Equipment***
48 hours recitation, non-credit $24.00
General principles and types of steam power plant equipment.

ME 018a **Steam Power Plant Equipment, Part I***
16 hours recitation, non-credit $ 8.00
Selected topics from ME 018.

ME 018b **Steam Power Plant Equipment, Part II***
32 hours recitation, non-credit $16.00
Selected topics from ME 018.

ME 019 **Steam Power Plant Testing***
48 hours recitation, non-credit $24.00
Interpretation and testing of power plant test codes and equipment.

ME 019a **Steam Power Plant Testing, Part I***
16 hours recitation, non-credit $ 8.00
Selected topics from ME 019.

ME 019b **Steam Power Plant Testing, Part II***
32 hours recitation, non-credit $16.00
Selected topics from ME 019.

ME 020 **Lubricants and Lubrication***
48 hours recitation, non-credit $24.00
Properties of oils and greases; oil film formation in a bearing; relationship between friction and other factors; description of oiling devices and systems; lubrication of such machines as steam turbines, gear units, air compressors, refrigerators, and other machines of interest to group.

ME 020a **Lubricants and Lubrication, Part I***
16 hours recitation, non-credit $ 8.00
Selected topics from ME 020.

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* The student must have a working knowledge of algebraic concepts and basic principles of physics.

ME 020b **Lubricants and Lubrication, Part II***
32 hours recitation, non-credit **$16.00**
Selected topics from ME 020.

School of Home Economics

APPLIED DESIGN

AD 51 **Survey of the Arts** cr. 3 **$21.00**
3 hours recitation each week.
Introductory study of visual arts in relation to problems of today.

AD 51L **Design** cr. 1 **$10.00**
3 hours laboratory each week.
Laboratory problems in lettering, color harmonies, simple all-over patterns, and posters.

AD 55 **Art Appreciation** cr. 3 **$21.00**
3 hours recitation each week.

CLOTHING AND TEXTILES

C&T 2 **Clothing the Individual** cr. 3 **$21.00**
3 hours recitation each week.
Must be preceded or accompanied by AD 51.
Selection and care of clothing and textiles.

C&T 2L **Clothing Construction** cr. 1 **$ 7.00**
2 hours laboratory each week.
Must be preceded or accompanied by C&T 2, and AD 51 and AD 51L.
Laboratory work in garment construction and repair.

C&T 27 **Wardrobe Planning** cr. 2 **$14.00**
2 hours recitation each week.
Fundamentals of costume selection and clothing budgets.

Non-Credit Courses

C&T 002 **Grooming and Personal Appearance**
16 or 32 hours recitation, non-credit **$8.00 or $16.00**

C&T 027 **Clothing the Family**
16 or 32 hours recitation, non-credit **$8.00 or $16.00**
Fundamentals of costume selection and clothing budgets.

FAMILY LIFE

FL 9 **Family Health** cr. 2 **$14.00**
2 hours recitation each week.
Lectures and demonstration on fundamental principles of nursing in the home, disease prevention, and maternal and infant care.

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* The student must have a working knowledge of algebraic concepts and basic principles of physics.

FL 171 **Marriage and Family Relationships** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.
Designed to provide further understanding of family relationships for those unmarried, those contemplating marriage, those married, and prospective counselors of all of them.

FOODS AND NUTRITION

F&N 1 **Food Selection** cr. 2 **$14.00**

2 hours recitation each week.
Selection of foods to make an adequate diet.

F&N 13 **Family Food Problems** cr. 2 **$14.00**

2 hours recitation each week.
Food selection for different income levels. Food buying and utilization; retail costs; varieties, brands, and grades. Food legislation.

Non-Credit Courses

F&N 013 **Food for the Family**

16 or 32 hours recitation, non-credit **$8.00 or $16.00**

Designed for the beginning housekeeper.

HOME MANAGEMENT

HM 8 **The House** cr. 3 **$21.00**

3 hours recitation each week.
Must be preceded by HM 7 (The House—Planning of Modern Homes).
Furnishing the modern home.

HM 69 **Housing the Family** cr. 3 **$21.00**

3 hours recitation each week.
Must be preceded by Applied Design 51 and 51L.
Housing of families at various income levels.

Non-Credit Courses

HM 08 **Decoration of the Modern Home**

16 or 32 hours recitation, non-credit **$ 8.00 or $16.00**

HM 08a **Selection of Furniture**

16 hours recitation, non-credit **$ 8.00**

HM 08b **Selection of Household Textiles**

16 hours recitation, non-credit **$ 8.00**

HM 08c **Color in the Home**

16 hours recitation, non-credit **$ 8.00**

HM 08d **Selection of Household Equipment**

16 hours recitation, non-credit **$ 8.00**

INSTITUTION MANAGEMENT

IM 136 **School Lunchroom Management** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.
For graduates in Home Economics who are managing lunchrooms and who have had courses in foods and nutrition approved by the Department.
Survey of school lunchroom problems; menu planning; purchase, preparation, and service of food; records; management; equipment.

IM 139 **Institution Food Purchasing** cr. 3 **$21.00 or $30.00**

2 hours recitation, 2 hours laboratory each week.
Must be preceded by IM 38 (Menu Planning), 38L (Quantity Cookery Laboratory), or 35 (Hospital Administration).
Methods of buying, bases of selection and storage of food.

Non-Credit Course

IM 040 **Cafeteria and Restaurant Management**

16 or 32 hours recitation, non-credit **$8.00 or $16.00**

Survey of cafeteria and restaurant problems; menu planning; purchase, preparation, and service of food; records; management; equipment.

An increasing number of girls are taking advantage of the opportunities offered through Purdue's off-campus Centers.

School of Pharmacy

Pre-Pharmacy Year. Students who expect to complete work for a degree in the School of Pharmacy should take a year of pre-pharmacy courses (School of Science, Pre-Pharmacy Option) followed by a three-year program of professional courses in the School of Pharmacy.

Students taking the pre-pharmacy year in colleges other than the School of Science, Purdue University, should submit 30 or more semester hours of credit, including the following:

General Inorganic Chemistry	6 hours
Mathematics (Algebra and Trigonomtry)	6 hours
English Composition	3 hours
Speech or Rhetoric	3 hours
Botany	4 hours
Zoology	4 hours
Approved Electives	4 to 6 hours
Total	30 to 32 hours

Approved electives include:

Modern Language	6 hours
Principles of Economics	3 or 6 hours
Introductory Sociology	3 hours
Elementary Psychology	3 hours
Engineering Drawing	2 or 4 hours
American Government	3 or 6 hours
Mathematics (Analytic Geometry and Calculus)	6 hours
English Literature or Expository Writing	3 hours

If an applicant has the required number of hours of academic credit but does not have credit for all prescribed subjects, he may be admitted with eight semester hours of deficiency, which must be made up before graduation.

The attention of applicants is directed to the following admission and residence provisions:

1. Students who have completed the pre-pharmacy year at Purdue or elsewhere cannot be assured of admission to the School of Pharmacy. When the number of qualified applicants exceeds the available facilities, preference will be given to residents of Indiana, and selection of students will be made on the basis of qualifications as determined from the transcript of record, examinations, and personal interviews.

2. Students will enter the professional program of study in the School of Pharmacy only at the beginning of the fall semester of each academic year. Application for admission should be made on or before April 1 preceding the planned entrance date.

3. Three years' residence in an accredited school or college of pharmacy is required for qualification for the degree of Bachelor of Science in Pharmacy.

School of Science

BIOLOGY

BIO 5	**Biology of Animals**	cr. 4	**$38.00**	3 hours recitation, 3 hours laboratory each week. Basic biological principles of animals.
BIO 6	**Introduction to Plant Life**	cr. 4	**$38.00**	3 hours recitation, 3 hours laboratory each week. Fundamental principles of structure and function of higher plants and a consideration of representative members of each plant group.
BIO 15*	**Applied Industrial Microbiology**	cr. 3	**$14.00 or $24.00**	2 hours recitation, 2 hours laboratory each week. Applications of microorganisms to industry and their relation to infection and immunity, public health, microbiological assay of foods, and preparation of antibiotics.
BIO 18*	**Bacteriology**	cr. 4	**$14.00 or $34.00**	2 hours recitation, 4 hours laboratory each week. Must be preceded by BIO 5 and 6. General bacteriology; methods of detection, isolation, and identification.
BIO 31	**Comparative Anatomy of Vertebrates**	cr. 4	**$43.00**	2 hours recitation, 6 hours laboratory each week. Must be preceded by BIO 1-2, or equivalent. Comparison of the structure of vertebrate animals; dissection of examples of the principal types.
BIO 39a	**Physiology, Part I**	cr. 3	**$21.00**	3 hours recitation each week. Must be preceded by BIO 1-2, or 5. Physiology of tissues in general; muscle, nerve, brain and sense organs.
BIO 39b	**Physiology, Part II**	cr. 3	**$21.00**	3 hours recitation each week. Must be preceded by BIO 1-2, or 5. Physiology of circulation, respiration, digestion, excretion, and endocrine glands.
BIO 121	**Pathogenic Bacteriology**	cr. 4	**$34.00 or $40.00**	2 hours recitation, 4 hours laboratory each week. Must be preceded by BIO 18. Pathogenic bacteria, protozoa, and viruses; infection, prevention, immunity, postmortem, serum reactions, and diagnostic methods.

CHEMISTRY

CHM 1	**General Chemistry**	cr. 4	**$38.00**	1 hour lecture, 2 hours recitation, 3 hours laboratory each week. Laws and principles of chemistry, with special emphasis upon topics most likely to be of importance in engineering. Numerical problems and relationships are introduced whenever quantitative treatment is possible.

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* May be offered as two-credit recitation course with special approval.

CHM 2 **General Chemistry** cr. 4 **$38.00**

1 hour lecture, 2 hours recitation, 3 hours laboratory each week.
Continuation of CHM 1.

CHM 11 **General Chemistry** cr. 3 **$31.00**

1 hour lecture, 1 hour recitation, 3 hours laboratory each week.
Required of all freshmen registered in the Schools of Agriculture, Home Economics, and Science, who are not in CHM 1-2.

CHM 12 **General Chemistry** cr. 3 **$31.00**

1 hour lecture, 1 hour recitation, 3 hours laboratory each week.
Continuation of CHM 11, for all students who are not in CHM 2.

CHM 26 **Qualitative Analysis** cr. 4 **$45.00**

2 hours recitation, 6 hours laboratory each week.
Should be preceded by CHM 2 or 12.
Semi-micro qualitative analysis of cations and anions. Introduction to chemistry of some less-familiar elements.

CHM 27 **Introductory Quantitative Analysis** cr. 4 **$45.00**

2 hours recitation, 6 hours laboratory each week.
Must be preceded by CHM 26.
Introduction to quantitative methods.

CHM 53 **Organic Chemistry** cr. 3 **$21.00**

3 hours recitation each week.
Must be preceded by CHM 2 or 12.
Survey of organic chemistry with emphasis on class reaction and practical applications.

CHM 54 **Organic Chemistry** cr. 3 **$21.00**

3 hours recitation each week.
Continuation of CHM 53.

CHM 55 **Organic Chemistry** cr. 4 **$38.00**

3 hours recitation, 3 hours laboratory each week.
Must be preceded by CHM 2 or 12.

CHM 56 **Organic Chemistry** cr. 4 **$38.00**

3 hours recitation, 3 hours laboratory each week.
Continuation of CHM 55.

Non-Credit Courses

CHM 001 **Principles of Chemistry**

16 hours recitation, non-credit **$ 8.00**

Basic laws and principles with emphasis on topics of importance to industry.

CHM 002a **Industrial Chemicals—Laboratory Testing**

24 hours laboratory, non-credit **$ 9.00**

Must be preceded by CHM 001, or equivalent. However, it would be advantageous for the student to precede this course by CHE 001.
Qualitative identification of materials of importance to industry.

CHM 002b **Survey of Analytical Methods**

16 hours recitation, non-credit **$ 8.00**

Must be preceded by CHM 001, or equivalent.
Principles of qualitative and quantitative methods of analysis, uses and limitations of methods—x-ray, electron microscope, photo-electrometer, spectroscope, infra-red, ultrasonics, and others.

CHM 003 **Fundamentals of Organic Chemistry**
16 hours recitation, non-credit $ 8.00
Basic concepts of the carbon atom and simple carbon compounds.

CHM 004a **Food Chemistry** 16 hours recitation, non-credit $ 8.00
Must be preceded by CHM 003, or equivalent.
Chemistry of carbohydrates, proteins, and fats.

CHM 004b **Chemicals of Medicinal Value**
16 hours recitation, non-credit $ 8.00
Must be preceded by CHM 003, or equivalent.

ENGLISH

ENG A **English Composition** non-credit **$24.00**
3 hours recitation each week.
For students who fail to pass the preliminary examination.

ENG 1 **English Composition** cr. 3 **$21.00**
3 hours recitation each week.
Prerequisite to all other courses in English except ENG A, B, C, E, and 32.

ENG 19 **Introduction to the Drama** cr. 3 **$21.00**
3 hours recitation each week.

ENG 27 **Introduction to Fiction** cr. 3 **$21.00**
3 hours recitation each week.

ENG 30* **Practical Writing for Industry** cr. 3 **$21.00**
3 hours recitation each week.
Must be preceded by ENG 1 or equivalent.

ENG 31 **Expository Writing** cr. 3 **$21.00**
3 hours recitation each week.
Students who have received a grade of 6 or 5 in ENG 1 and grades of 6, 5, or 4 in two subsequent courses in English and Speech may, with the approval of the head of the Department of English, substitute for ENG 31 an advanced course in English or in another department.

ENG 32 **English Composition** cr. 3 **$21.00**
3 hours recitation each week.
For freshmen provisionally excused from ENG 1 because of superior accomplishment in composition as shown in the orientation tests. Students who pass the course will be excused from ENG 31. Those who receive grade 4 or better will also be given credit for ENG 1; others must take ENG 1.

ENG 111 **Modern Drama: The Plays of Ibsen and Bernard Shaw** cr. 3 **$21.00 or $30.00**
3 hours recitation each week.

ENG 121 **Business Writing: General Applications**
cr. 3 **$21.00 or $30.00**
3 hours recitation each week.

ENG 132 **Modern English and American Poetry**
cr. 3 **$21.00 or $30.00**
3 hours recitation each week.

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* May be offered as a two-credit course with special approval.

ENG 137 **Advanced English Composition** cr. 3 **$21.00 or $30.00**
3 hours recitation each week.

Non-Credit Courses

ENG 001 **Everyday English**
16 or 32 hours recitation, non-credit **$8.00 or $16.00**
Grammar, punctuation, and spelling, and their application in writing.

ENG 002 **How to Read and Evaluate Fiction**
16 or 32 hours recitation, non-credit **$8.00 or $16.00**

ENG 003 **Business Letter Writing**
16 or 32 hours recitation, non-credit **$8.00 or $16.00**
Form and content of routine types of business letters.

ENG 004 **Report Writing**
16 or 32 hours recitation, non-credit **$8.00 or $16.00**
Form and content of routine types of business and technical reports.

SPEECH

SPE 11* **Public Speaking** cr. 2 **$14.00**
1 two-hour class period per week, primarily for part-time students. Basic elements of delivery and simple forms of speech composition, with practice to develop self-confidence and fluency.

SPE 12* **Public Speaking** cr. 2 **$14.00**
1 two-hour class period per week, primarily for part-time students. Continuation of SPE 11. Study of speech composition with practice in preparation and delivery of information and persuasive speeches.

SPE 14* **Principles of Speech** cr. 3 **$21.00**
3 one-hour meetings per week.

Non-Credit Courses

NOTE: Each of the non-credit courses listed below (SPE 01, 02, 03, 08, and 09), are designed for one two-hour meeting each week for eight weeks.

SPE 01 **Basic Public Speaking**
16 hours recitation, non-credit **$ 8.00**
Beginning course in public speaking designed to develop self-confidence and basic skill in presentation of simple forms of public speaking.

SPE 02 **Informative and Persuasive Speaking**
16 hours recitation, non-credit **$ 8.00**
Study and practice in preparation and delivery of basic types of public speaking. Special emphasis on clear organization, use of interesting and logical material, and effective delivery.

SPE 03 **Discussion, Leadership, and Participation**
16 hours recitation, non-credit **$ 8.00**
Study and practice in preparation and conduct of group conferences, panel discussions, study groups, and committee meetings.

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* Credit in SPE 11 and 12 combined may be accepted in lieu of SPE 14 as a requirement for graduation. Credit can not be earned in both SPE 14 and the SPE 11 and 12 combination.

SPE 08 **Practical Speaking**

16 hours recitation, non-credit **$ 8.00**

Practice in preparation and delivery of public speeches, intended for mature adults who wish to improve their speaking ability. Emphasis is placed on frequent practice with individual guidance and criticism.

SPE 09 **Parliamentary Procedure for Conducting Meetings**

16 hours recitation, non-credit **$ 8.00**

Study and practice in use of parliamentary law, and in organization and conduct of both formal and informal business meetings.

HISTORY

HIST 2 **European History, 1815-1914** cr. 3 **$21.00**

3 hours recitation each week.

HIST 3 **Europe Since 1914** cr. 3 **$21.00**

3 hours recitation each week.
Credit will not be given for both HIST 1 (History of Europe since 1914) and 3.

HIST 5 **The United States and Its Place in World Affairs** cr. 3 **$21.00**

3 hours recitation each week.

History of United States since 1914, and its participation in world affairs.

HIST 106 **American History to 1865** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.

HIST 107 **American History from 1865 to the Present Time** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.

Non-Credit Courses

HIST 01 **Contemporary European History**

16 or 32 hours recitation, non-credit **$8.00 or $16.00**

HIST 05 **The United States and Its Place in World Affairs**

16 or 32 hours recitation, non-credit **$8.00 or $16.00**

HIST 010 **Political and Cultural Survey of Russia**

16 or 32 hours recitation, non-credit **$8.00 or $16.00**

ECONOMICS

ECON 1 **Principles of Economics** cr. 3 **$21.00**

3 hours recitation each week.
Credit will not be given for both ECON 1 and 11 (Principles of Economics).

ECON 11 **Principles of Economics** cr. 3 **$21.00**

3 hours recitation each week.

Credit will not be given for both ECON 1 and 11.

ECON 12 **Principles of Economics** cr. 3 **$21.00**

3 hours recitation each week.

Must be preceded by ECON 1 or 11.

ECON 121 **Labor Economics** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.
Must be preceded by ECON 1 or 11.

ECON 124 **Labor Law** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.
Must be preceded by ECON 121, or consent of instructor.
Court decisions in respect to labor.

ECON 125* **Business Law** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.
Must be preceded by ECON 1 or 11, or equivalent.
Introduction to American business law, covering persons, torts, contracts, and agency.

ECON 130* **Economic Geography** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.
Geographic factors determining production and industry in principal regions of the world.

Non-Credit Courses

ECON 01 **Principles of Economics**

16 or 32 hours recitation, non-credit **$8.00 or $16.00**

ECON 010 **Industrial Economics**

12 or 16 hours recitation, non-credit **$6.00 or $ 8.00**

Factors determining our standard of living and how this standard is affected by restrictive practices, the level of prices, and the maturity and immaturity of the economy.

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* May be offered as a two-credit course with special approval.

CHARTERED LIFE UNDERWRITERS (CLU) REVIEW COURSES

These courses are open to men and women engaged in the life insurance business who have had at least a high-school education and one year of experience in the life insurance business, supplemented by such additional experience as may be required by the CLU admissions committee. The courses are designed to facilitate the taking of examinations leading to Chartered Life Underwriters (CLU) designation.

ECON 05a **CLU—Life Insurance Fundamentals**

32 or 48 hours recitation, non-credit **$16.00 or $24.00**

In addition to meeting the minimum requirements, all candidates preparing for Part A of the CLU examinations should be acquainted with the fundamentals of personal salesmanship and of sales psychology, in order that they may be more effective in the use of the subject matter covered in Part A, even though questions in these fields are not included in the Part A examination.

Part A includes economics and uses of life insurance; analysis of contracts; mathematics of rates and reserves; life insurance trusts; business insurance; group, industrial, and other forms of insurance; investments of insurance companies.

ECON 05b **CLU—Background Education for Insurance**

32 or 48 hours recitation, non-credit **$16.00 or $24.00**

This background education in the field of social studies includes economics, government, and sociology. Emphasis is placed on such phases as will prove useful in supplying insurance men with fundamental principles in these related fields.

ECON 05c **CLU—Law, Trust and Taxes**

32 or 48 hours recitation, non-credit **$16.00 or $24.00**

Fundamental principles of general commercial law; wills, trusts, and estates; taxation and business insurance.

ECON 05d **CLU—Finance**

32 or 48 hours recitation, non-credit **$16.00 or $24.00**

This review course is divided into three parts—corporation finance; money, credit, and banking; and investments. The financing of corporations; consideration of corporation securities. Principles underlying money, essential features of the American banking and credit system. Fundamentals of investments; life insurance as an investment.

ECON 05e **CLU—Life Underwriters (Comprehensive)**

32 or 48 hours recitation, non-credit **$16.00 or $24.00**

Comprehensive review of the fundamental principles designed to facilitate orientation for the taking of examinations leading to the Chartered Life Underwriters designation.

GOVERNMENT

GVMT 30 **Elements of Democracy** cr. 3 **$21.00**

3 hours recitation each week.

Not open to students who have had GVMT 9 or 10 (Introduction to American Government).

Fundamental problems all governments must face, and how they are met in a democracy as contrasted with other types of society.

GVMT 109* **International Relations** cr. 3 **$21.00 or $30.00**
3 hours recitation each week.
Introductory survey of underlying forces in international relations, foreign policies of the Great Powers, and agencies of control and cooperation.

GVMT 110* **Contemporary International Problems**
cr. 3 **$21.00 or $30.00**
3 hours recitation each week.
Current international issues and developments in international cooperation and world order.

Non-Credit Courses

GVMT 020 **Government in Action**
16 hours recitation, non-credit **$ 8.00**

GVMT 025 **Contemporary Political and Social Problems**
16 or 32 hours recitation, non-credit **$8.00 or $16.00**

MATHEMATICS

NOTE: Engineering students take MA 1, 2, 3 and 4, (MA 5 instead of MA 4 in Electrical Engineering; MA 4 and 107 may be substituted for MA 5). Those with inadequate preparation take MA 31, 32, 3 and 4. Science students majoring in mathematics, physics, and chemistry should take the same sequence as engineering students. Other science students take MA 11 and 12. Students may substitute MA 11 and 12 when MA 1 is unavailable.

MA 1 **Algebra and Trigonometry** cr. 5 **$35.00**
5 hours recitation each week.
Required for engineering students and those science students who major in mathematics, physics, or chemistry. Students with inadequate preparation will be assigned to MA 31.

MA 2 **Analytic Geometry** cr. 5 **$35.00**
5 hours recitation each week.
Must be preceded by MA 1, or 11 and 12.

MA 3 **Calculus I** cr. 4 **$28.00**
4 hours recitation each week.
Must be preceded by MA 2 or 32.

MA 4 **Calculus II** cr. 4 **$28.00**
4 hours recitation each week.
Must be preceded by MA 3.

MA 11 **Trigonometry** cr. 3 **$21.00**
3 hours recitation each week.
Should be preceded by MA 12.

MA 12 **Algebra** cr. 3 **$21.00**
3 hours recitation each week.

MA 15 **Algebra** cr. 4 **$28.00**
4 hours recitation each week.

MA 16 **Analytic Geometry** cr. 4 **$28.00**
4 hours recitation each week.

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* May be offered as a two-credit course with special approval.

MA 31 **Elementary Engineering Mathematics** cr. 5 **$42.00**

6 hours recitation each week.
For engineering students with inadequate preparation for MA 1.

MA 32 **Elementary Engineering Mathematics** cr. 5 **$42.00**

6 hours recitation each week.
Continuation of MA 31.

MA 51 **Elementary Statistics** cr. 3 **$21.00**

3 hours recitation each week.
Must be preceded by MA 11 and 12, or equivalent.
Emphasis on practical applications to all fields; machine calculation and interpretation of data.

MA 52 **Elementary Statistics** cr. 3 **$21.00**

3 hours recitation each week.
Continuation of MA 51.

MA 107 **Differential Equations** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.
Must be preceded by MA 4.
Derivations and solution of differential equations for problems in physics, chemistry and engineering.

MA 127 **Advanced Calculus** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.
Must be preceded by MA 4.
Limits, continuity, and differentiation of functions of one and several variables; the Riemann integral; multiple, line, and surface integrals.

MA 128 **Advanced Calculus** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.
Continuation of MA 127.
The real number system, infinite series, power series, Fourier series, improper integrals, gamma function, implicit functions, Jacobians. Emphasis on rigorous proof.

MA 155 **Statistical Methods in Engineering**
cr. 3 **$21.00 or $30.00**

3 hours recitation each week.
Must be preceded by MA 4, or equivalent.
Frequency distribution, control charts for measurements and attributes, simple probability, acceptance sampling, linear correlation and applications.

Non-Credit Courses

MA 001 **Arithmetic for Adults**
20-60 hours recitation, depending on the
needs of the group, non-credit **$10.00 to $30.00**

MA 000a **High School Algebra, 1st semester**
51 hours recitation, non-credit **$25.00**

MA 000b **High School Algebra, 2nd semester**
51 hours recitation, non-credit **$25.00**

MA 000c	**High School Algebra, 3rd semester**	51 hours recitation, non-credit	**$25.00**
MA 00a	**Plane Geometry, 1st semester**	51 hours recitation, non-credit	**$25.00**
MA 00b	**Plane Geometry, 2nd semester**	51 hours recitation, non-credit	**$25.00**
MA 0	**Solid Geometry**	34 hours recitation, non-credit	**$17.00**
MA 002a	**Essentials of Slide Rule Operation**	10 hours recitation, non-credit	**$ 5.00**
MA 002b	**Slide Rule: Trigonometric Applications**	10 hours recitation, non-credit	**$ 5.00**
MA 011	**Practical Trigonometry**	32 hours recitation, non-credit	**$16.00**
MA 051	**Statistical Analysis**	48 hours recitation, non-credit	**$24.00**

MODERN LANGUAGES

ML 21	**Beginning French** 3 hours recitation each week.	cr. 3	**$21.00**
ML 22	**Beginning French** 3 hours recitation each week. Must be preceded by ML 21, or equivalent. Continuation of ML 21.	cr. 3	**$21.00**
ML 41	**First Course in Standard German** 3 hours recitation each week.	cr. 3	**$21.00**
ML 42	**Second Course in Standard German** 3 hours recitation each week. Must be preceded by ML 41, or equivalent. Continuation of ML 41.	cr. 3	**$21.00**
ML 61	**First Course in Spanish** 3 hours recitation each week.	cr. 3	**$21.00**
ML 62	**Second Course in Spanish** 3 hours recitation each week. Must be preceded by ML 61, or equivalent. Continuation of ML 61.	cr. 3	**$21.00**

Non-Credit Courses

ML 066	**Elementary Conversational Spanish**	16 or 32 hours recitation, non-credit	**$8.00 or $16.00**

PHYSICS

PHY 1 **General Physics** cr. 4⅓ **$34.00**
4 hours recitation, 1 hour laboratory each week.
Must be preceded by MA 1, 2.
Mechanics, properties of matter, heat.

PHY 1d **Physics for Nurses** cr. 5 **$43.00**
4 hours recitation, 3 hours laboratory each week.

PHY 21 **General Physics** cr. 5 **$43.00**
4 hours recitation, 3 hours laboratory each week.
Must be preceded by MA 2.
Mechanics, properties of matter, heat, with illustrative laboratory experiments.

PHY 22 **General Physics** cr. 5 **$43.00**
4 hours recitation, 3 hours laboratory each week.
Must be preceded by PHY 21.
Electricity, sound, light, with illustrative laboratory experiments.

PHY 34 **General Physics** cr. 4 **$37.00**
3 hours recitation, 3 hours laboratory each week.
Must be preceded by MA 11 and 12, or by MA 9.
Mechanics, heat, and sound, for students not specializing in physics.

PHY 35 **General Physics** cr. 4 **$37.00**
3 hours recitation, 3 hours laboratory each week.
Must be preceded by PHY 34, or equivalent.
Electricity, light, and modern physics, for students not specializing in physics.

PHY 105 **Acoustics** cr. 3 **$21.00 or $30.00**
3 hours recitation each week.
Must be preceded by MA 4, and by two terms of general physics (PHY 21 and 22).
Introduction to acoustics of reproduction and communications systems; architectural acoustics; sound production and reception.

PHY 106 **Electricity and Magnetism** cr. 3 **$21.00 or $30.00**
3 hours recitation each week.
Must be preceded by PHY 10, or equivalent.
Introductory theoretical course. Vector analysis; electrostatic problems; theory of dielectrics; theory of conduction; thermoelectric and photoelectric phenomena; electromagnetic effects due to steady and changing currents; magnetic properties of matter; Maxwell's equations; radiation.

PHY 124 **Introduction to Modern Physics** cr. 3 **$21.00 or $30.00**
3 hours recitation each week.
Must be preceded by PHY 21-22, or equivalent.
Historical survey of modern physics up to 1927. Kinetic theory; the electron; ions; isotopes; quantum theory of radiation; photons; Bohr theory of the atom; the spectrum of hydrogen; X-ray spectra; shell structure of the atom, and interpretation of the Periodic Table.

PHY 125 **Introduction to Modern Physics** cr. 3 **$21.00 or $30.00**
3 hours recitation each week.
Must be preceded by PHY 124.
A continuation of PHY 124, primarily for students outside the Department of Physics.
Natural and artificial radioactivity; nuclear physics; relativity, astrophysics.

Non-Credit Courses

PHY 001 **Principles of Mechanics**
48 hours recitation, non-credit **$24.00**

PHY 002 **Principles of Heat**
48 hours recitation, non-credit **$24.00**

PHY 003 **Principles of Electricity**
48 hours recitation, non-credit **$24.00**

PHY 004 **Review of Physics for Engineers**
48 hours recitation, non-credit **$24.00**

Division of Education and Applied Psychology

EDUCATION

EDU 15 **Special Methods of Teaching Trade and Industrial Subjects** cr. 3 **$21.00**
3 hours recitation each week.
Must be preceded by PSY 1, 2, and EDU 3, 4.
Principles and procedures for teaching trade and industrial subjects.

EDU 31 **School Shop Management** cr. 3 **$21.00**
3 hours recitation each week.
The school shop and drawing room, including equipment and management.

EDU 33 **Principles and Practices of Industrial Training Programs** cr. 3 **$21.00**
3 hours recitation each week.

EDU 35 **Occupational and Trade Analysis** cr. 3 **$21.00**
3 hours recitation each week.
Elements of the trade or subjects which the student is preparing to teach.

EDU 39 **Organization of Instruction Material for Trades and Industries** cr. 3 **$21.00**
3 hours recitation each week.
Must be preceded by PSY 1 and 2, and EDU 3, 4, and 35.
Application of governing principles to establish an effective arrangement of teaching content required for occupational courses in vocational schools and classes.

EDU 101 **Audio-Visual Aids for Teachers** cr. 3 **$28.00 or $34.00**
2 hours recitation, 3 hours laboratory each week.
Must be preceded by twelve hours of education and psychology.
Theory, sources, selection, and effective use of audio-visual aids and preparation of audio-visual materials.

EDU 112 **The Use of Community Resources in Guidance** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.
Emphasizes the analysis and utilization of the available community resources that have a bearing upon the development and activities of young people.

EDU 118 **Curriculum Development in Industrial Arts** cr. 2 or 3 **$7.00 or $10.00 per credit hour**

2 or 3 hours recitation each week.

EDU 123 **Introduction to the Technology of Tests and Measurements** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.
Must be preceded by PSY 131.
Introductory course in the theory and practice of measurement, with illustrations from education, industry, and business; emphasis on the guidance functions of the measuring devices studied.

EDU 135 **Principles and Problems of Vocational and Educational Guidance** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.
Must be preceded by twelve hours of psychology and education or equivalent professional training.
The development of vocational and educational guidance in the home, school, industry, and service organizations; consideration of the principles and an over-view of present practices in such guidance.

EDU 137 **Tests and Measurements in Industrial Education** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.
Must be preceded by PSY 131 or equivalent.
Designed for industrial education students as an alternate course for EDU 123. Concepts involved in testing and measuring, with applications in industry and industrial education.

EDU 138 **Educational and Industrial Co-ordination** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.
Must be preceded by PSY 1, 2, and EDU 3, 4, 15, and 35.
Common problems of education and industry, with emphasis on preparation for the work of the coordinator.

EDU 139 **Organization of Instruction Materials for Trades and Industries** cr. 1 or 3 **$7.00 or $10.00 per credit hour**

1 to 3 hours recitation each week.
Must be preceded by PSY 1, 2, and EDU 3, 4, 15, and 35, or by permission of instructor.
Application of governing principles to establish an effective arrangement of teaching content required for occupational courses in vocational schools and classes.

EDU 163 **Conference Leadership Training** cr. 2 or 3 **$7.00 or $10.00 per credit hour**

2 to 3 hours recitation each week.
Training by the conference method, making use of devices, techniques, and material necessary to the work of the conference leader.

EDU 164 **Problems in the Administration, Organization, and Supervision of Part-Time and Evening Schools in Trade and Industrial Education** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.
Consideration of the problems faced by the teachers in conducting part-time and evening-school classes in trades and industries, with particular emphasis on content and methods to be used.

EDU 187 **Foundations of Education** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.
Must be preceded by twelve hours in education.
A systematic examination of the aims and purposes of education from the point of view of the needs of society, the basic needs of the child, and educational philosophy.

EDU 199 **Research in Trades and Industries** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.

EDU 222 **Secondary School Curriculum** cr. 2 or 3 **$20.00 or $30.00**

2 to 3 hours recitation each week.
The objectives, organization, and administration of the secondary-school curriculum.

EDU 227 **Organization and Administration of Vocational Education** cr. 3 **$30.00**

3 hours recitation each week.
Must be preceded by twelve hours in education or by equivalent professional training.
Major phases of vocational education; purpose, laws, administrative machinery, federal, state, and local; sources and expenditures of funds; kinds of classes and purposes of each; vocational teacher-training; relation between vocational education and land-grant college extension work; emphasis on vocational education in Indiana.

EDU 229 **Seminar in Vocational Trade and Industrial Education** cr. 3 **$30.00**

3 hours recitation each week.
Must be preceded by twelve hours in education or by equivalent professional training.
Current problems in vocational trade and industrial education.

EDU 230 **Seminar in Home Economics Education** cr. 2 to 6 **$20.00 to $60.00**

Must be preceded by twelve hours in education or by equivalent professional training.
Current problems in home economics education. May be repeated for credit.

PSYCHOLOGY

PSY 1* **Elementary Psychology** cr. 3 **$21.00**

3 hours recitation each week.
Freshmen will be admitted only with approval of instructor.
Introduction to fundamental principles of psychology covering particularly the topics of personality, intelligence, emotion, attention, perception, learning, memory, and thinking.

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* May be offered as a two-credit course with special approval.

PSY 2 **Educational Psychology** cr. 3 **$21.00**

3 hours recitation each week.
Must be preceded by PSY 1, or equivalent.
Introduction to the problems of the pupil; educational adjustment, with emphasis on the application of psychological principles to teaching.

PSY 3 **Psychology of Personal Maturity** cr. 3 **$21.00**

3 hours recitation each week.
Must be preceded by PSY 1, or equivalent.
Application of the study of motives, emotions, and mechanisms of response to personal and social adjustment, with emphasis upon self-understanding.

PSY 9 **Child Psychology** cr. 3 **$21.00**

3 hours recitation each week.
Must be preceded by PSY 1, or equivalent.
Age-level characteristics and needs of children from birth to the teens in motor control, language, learning, play, etc.; children's motivations and emotional characteristics; interpersonal relations and other factors affecting children.

PSY 103 **Mental Hygiene in Education** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.
Must be preceded by PSY 1 and 2, or equivalent.
General principles of mental and emotional health and how to set up constructive conditions for the years of childhood and youth; the child in relation to parents, teachers, and other children.

PSY 109 **Problems in Child Psychology** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.
Must be preceded by six semester hours of psychology.
Development of the child from birth to adolescence, with special study of such topics as play, sex differences, characteristics of learning at different age levels, and relative parts played by heredity and environment in the child's growth. Problems of special interest to members of class will be considered.

PSY 131 **Statistical Methods Applied to Psychology, Education and Sociology** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.
Must be preceded by six hours of education or psychology. Required of all candidates for degree of Master of Science in Psychology.
Application of elementary statistical concepts, such as central tendency, variability, correlation, validity, and reliability, to problems of psychology and mental measurements.

PSY 141 **Abnormal Psychology** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.
Must be preceded by twelve semester hours of psychology.
Various forms of mental disorder from standpoint of their origin, treatment, prevention, and social significance; mental deficiency and special disabilities. Particular attention to relation between aberrations and problems or normal human adjustment.

PSY 153 **Introduction to Clinical Psychology** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.
Must be preceded by twelve hours of psychology.
The case-study method, including a discussion of the importance of historical information, the contribution of clinical tests to diagnosis, and a general survey of prevention and treatment techniques.

PSY 173 **Personnel Psychology** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.
Introduction to psychology through the topics of individual differences, aptitude testing, merit ratings, industrial safety, motivation, morale, and training.

PSY 174 **General Social Psychology** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.
Must be preceded by six hours of psychology or three hours of psychology and three hours of sociology.
Conditions and consequences of human behavior in social situations, with emphasis upon the mechanism and the processes on the basis of which socialization takes place.

Non-Credit Courses

PSY 01 **General Psychology**

16 hours recitation, non-credit **$ 8.00**

PSY 03 **Personal Relations in Industry**

16 hours recitation, non-credit **$ 8.00**

PSY 09 **Psychology of Child Training**

16 hours recitation, non-credit **$ 8.00**

SOCIOLOGY

SOC 1 **Introductory Sociology** cr. 3 **$21.00**

3 hours recitation each week.
Presents an over-view of the science and principles of human relationship, social organization, social societies, and social control.

SOC 11 **Social Problems** cr. 3 **$21.00**

3 hours recitation each week.
Major social problems of the day—social conflict, family breakdown, the physically and mentally handicapped, poverty, crime, etc.; modern trends in prevention and treatment.

SOC 111 **Criminology and Penology** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.
Must be preceded by SOC 1 or 11, or equivalent.
Nature and causes of crime; methods of dealing with adult and juvenile offenders; consideration of present programs for the social treatment of crime in the light of needed changes.

SOC 141 **Agricultural Sociology** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.
The structure and functions of rural society; rural people, groups, institutions, and organizations; current social problems in rural society.

SOC 151 **The Sociology of Cities** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.
Nature and ecology of urban societies; types of social behavior in cities; metropolitan regions and city planning with emphasis upon usefulness of cities.

SOC 171 **Marriage and Family Relations** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.
Social, psychological, and economic problems of the family.

SOC 182 **Social Bases of Education** cr. 3 **$21.00 or $30.00**

3 hours recitation each week.
Must be preceded by PSY 1 and SOC 1.
Sociological interpretation and evaluation of school and non-school education.

Non-Credit Course

SOC 071 **Marriage and Family Relations**
16 hours recitation, non-credit **$ 8.00**

Social, psychological, and economic problems of the family.

Division of Physical Education for Men

PEM 12 **Physical Activities** cr. 1 **$12.00**

3 hours laboratory each week.
Activities designed to improve organic vigor and neuro-muscular skills.

PEM 80 **First Aid and Safety** cr. 2 **$14.00**

1 hour recitation, 3 hours laboratory each week.

PEM 167* **Organization of Choral and Orchestral Recreation**
cr. 3 **$29.00 or $35.00**

2 hours recitation, 3 hours laboratory each week.
Organization, direction, and maintenance of choral and instrumental recreation with special emphasis on the non-technical approach to make music attractive as an activity for industrial employees.

PEM 265 **Principles and Practices in Industrial Recreation** cr. 3 **$30.00**

3 hours recitation each week.
Must be preceded by PEM 34b (Introduction to Industrial Recreation) and PEM 95 (Field Experience in Industrial or Community Recreation), or permission of the instructor.
For graduate students only.

Non-Credit Courses

PEM 06 **Swimming** 16 hours laboratory, non-credit **$ 6.00**

PEM 07 **Swimming, Advanced**
16 hours laboratory, non-credit **$ 6.00**

PEM 08 **Recreational Activities**
16 hours laboratory, non-credit **$ 6.00**

Physical Education for Women

PEW 53 **Physical Education** cr. 1 **$ 9.00**

2 hours laboratory each week.
Improvement of personal technique in motor skills that have high leisure-time value and contribute to maintenance of physical fitness.

PEW 54 **Physical Education** cr. 1 **$ 9.00**

2 hours laboratory each week.
Continuation of PEW 53.

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* May be offered as a two-credit recitation course with special approval.

University Staff

Technical Extension Division

Subject-Matter Supervisors

Arnold A. Alberts, B.A., M.S., Ph.D.	Department of Chemistry
Homer R. Allen, B.P.E., M.Ed.	Division of Physical Education for Men
Harold T. Amrine, B.S.M.E., M.S.M.E.	Department of General Engineering
Eston J. Asher, B.D., M.A.	Division of Education and Applied Psychology
Harold T. Christensen, B.S., M.S., Ph.D.	Department of Sociology
Clarence J. Goodnight, A.B., A.M., Ph.D.	Department of Biology
E. Glenn Griffin, B.A., M.A.	Department of English
Frank R. Hall, A.B., M.A.	Department of History, Economics, and Government
Elton Hocking, A.B., A.M., Ph.D.	Department of Modern Languages
M. Wiles Keller, A.B., A.M., Ph.D.	Department of Mathematics
Ralph W. Lefler, A.B., A.M.	Department of Physics
Elizabeth L. Mackey, B.S., M.A., Ph.D.	Department of Biology
J. Howard Porsch, B.S.C.E., M.S.C.E.	Department of General Engineering
Isidor Walerstein, B.A., Ph.D.	Department of Physics
Leland S. Winch, B.A., M.A.	Department of Speech

Full-Time Teaching Staff

Maurice D. Adams (1946) Assistant Professor of Physics (Indianapolis)
B.S., Indiana State Teachers, 1926; M.Ed., Pittsburgh, 1933

Mark P. Anderson (1949) Instructor in Biology (Calumet)
A.B., Lawrence, 1923; M.Ed., Montana, 1947

William R. Beck (1948) Instructor in Mathematics (Ft. Wayne)
B.A., Brooklyn College, 1947; M.A., New York University, 1948

Harold A. Bedient (1947) Assistant Professor of Chemistry (Calumet)
A.B., Albion, 1916; Ph.D., Cornell, 1926

Frederick B. Bell (1947) Instructor in Psychology (Indianapolis)
B.S., Denver, 1939; M.S., Purdue, 1948

J. Hal Carter (1947) Associate Professor of Chemistry (Ft. Wayne)
A.B., Union University, 1925; M.S., Vanderbilt, 1927; Ph.D., Iowa State College, 1931

Allen G. Cleaver (1948) Instructor in General Engineering (Ft. Wayne)
B.S., Indiana State Teachers, 1927

Leon W. Cone, Jr. (1948)
Instructor in History, Economics and Government (Calumet)
B.S., University of Massachusetts, 1938; M.A., University of Illinois, 1946

Wilbur W. Chambers (1946) Instructor in Mathematics (Indianapolis)
A.B., Colorado State College of Education, 1925; M.A., 1926

Noland T. Cooper (1946) Instructor in Mathematics (Ft. Wayne)
B.S., Ed., Central Missouri State Teachers, 1936; M.A., Missouri, 1939

Carl C. Cramer (1946)
Instructor in General Engineering (Indianapolis)
B.S., Stout, 1925; M.S., Colorado Agricultural, 1932

Helen L. Criswell (1948) Instructor in English (Ft. Wayne)
A.B., Hiram College, 1924

Harold W. Crowder (1950) Instructor in Biology (Ft. Wayne)
B.S., Oklahoma A. & M., 1932; M.S., 1940; Ph.D., Kansas, 1950

Golden A. Flake (1947) Instructor in Physics (Indianapolis)
B.Ed., Eastern Illinois State Teachers, 1933; M.A., Northwestern, 1942

Raymond G. Goodin (1946) Instructor in Chemistry (Indianapolis)
B.S., Purdue, 1940

Oskar R. Hauenstein (1947)
Instructor in Engineering Drawing (Calumet)
Military Engineer, K.u.k. Pioneer Kadettenschule, Hainburg, Austria, 1901;
Civil Engineer, K.u.k. Hoeherer Geniekurs, Wien, Austria, 1908

Loren T. Jones (1947) Associate Professor of Chemistry (Indianapolis)
B.S., Iowa, 1931; M.S., Michigan, 1933; Ph.D., 1934

Martin L. Krauss (1946)
Instructor in History and Government (Indianapolis)
B.S., Michigan State, 1936; M.A., 1937

Robert M. Kunse (1946)
Instructor in Engineering Drawing (Indianapolis)
B.S.E.E., Purdue, 1911; M.A., Indiana, 1930

Robert R. LaFollette (1948) Instructor in Chemistry (Ft. Wayne)
B.S., Indiana State Teachers College, 1948

A. P. McDonald (1948)
Assistant Professor of Engineering Drawing (Indianapolis)
B.S.E.E., Texas A. & M., 1930; M.S., 1943

Beckham Martin (1946) Instructor in Physics (Ft. Wayne)
A.B., Oakland City, 1926; A.M., Indiana, 1933

Mary L. Mendiones (1946) Assistant Professor of English (Indianapolis)
A.B., Knox, 1936; M.A., Illinois, 1938; Ph.D., 1943

Joseph Henry Meyers (1946)
Assistant Professor of English (Indianapolis)
A.B., Xavier (Ohio), 1925; M.A., Princeton, 1926

Vera T. Morris (1946) Instructor in Mathematics (Indianapolis)
A.B., DePauw, 1912

Howard D. Murdock (1946) Instructor in Chemistry (Michigan City)
B.S., Notre Dame, 1937; M.S., 1940

Edward F. Nugent (1946) Instructor in English (Indianapolis)
A.B., Holy Cross, 1939; A.M., Clark, 1940

Ralph V. Pritchard (1946) Instructor in Mathematics (Calumet)
B.S., Central Normal, 1913; A.B., Butler, 1923

Gerald G. Raderstorf (1950)
Instructor in Physical Education (Ft. Wayne)
B.P.E., Purdue, 1950

William R. Roark (1946) Instructor in Chemistry (Indianapolis)
A.B., William Jewell, 1930

Paul H. Seehausen (1948) Instructor in Chemistry (Indianapolis)
B.S.Ch.E., Purdue, 1947

Lloyd W. Smith (1948) Instructor in Civil Engineering (Indianapolis)
B.S.C.E., Purdue, 1940

Leslie M. Sparks (1946)
Instructor in History and Government (Indianapolis)
B.S.L., Butler, 1936; M.S., 1946

Sigrid Stark (1946) Instructor in English (Calumet)
B.Ed., Wisconsin State Teachers (Stevens Point), 1933; M.A., Northwestern, 1938

Wilfrid A. Stock (1946) Instructor in Mathematics (Calumet)
B.S., Lewis Institute, 1935; M.A., Northwestern, 1938

Anna K. Suter (1947) Instructor in Mathematics (Indianapolis)
A.B., Butler, 1927; A.M., Indiana, 1936

Theodore A. Thelander, Jr. (1947)
Assistant Professor of History and Government (Indianapolis)
B.A., Wisconsin, 1936; Ph.D., 1940

Adult classes are designed to meet the needs of special interest groups.

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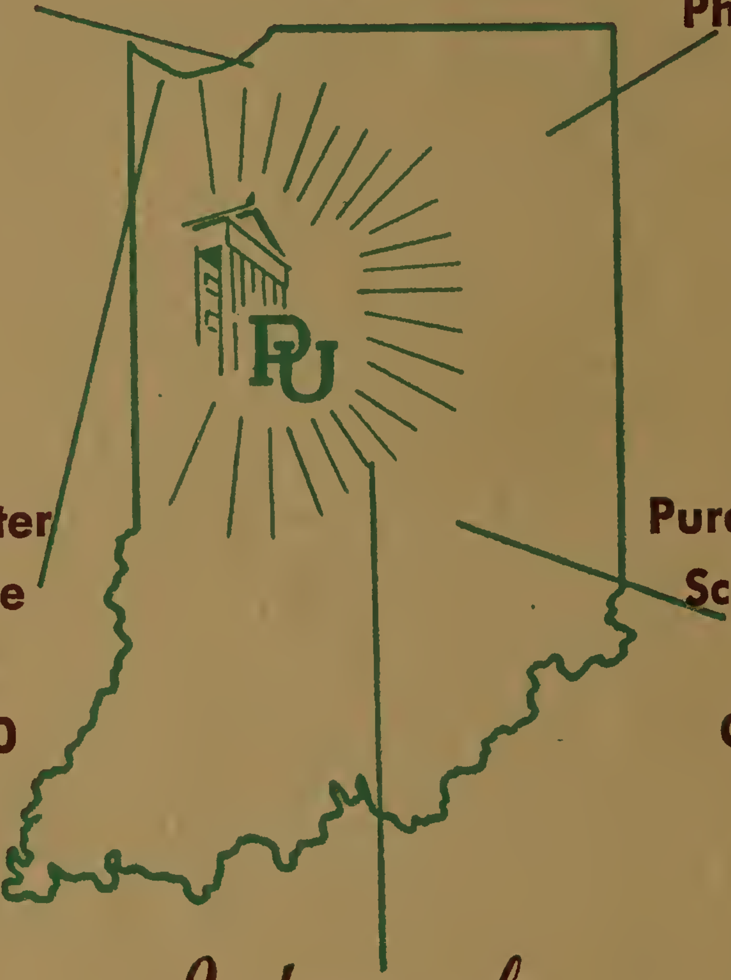

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